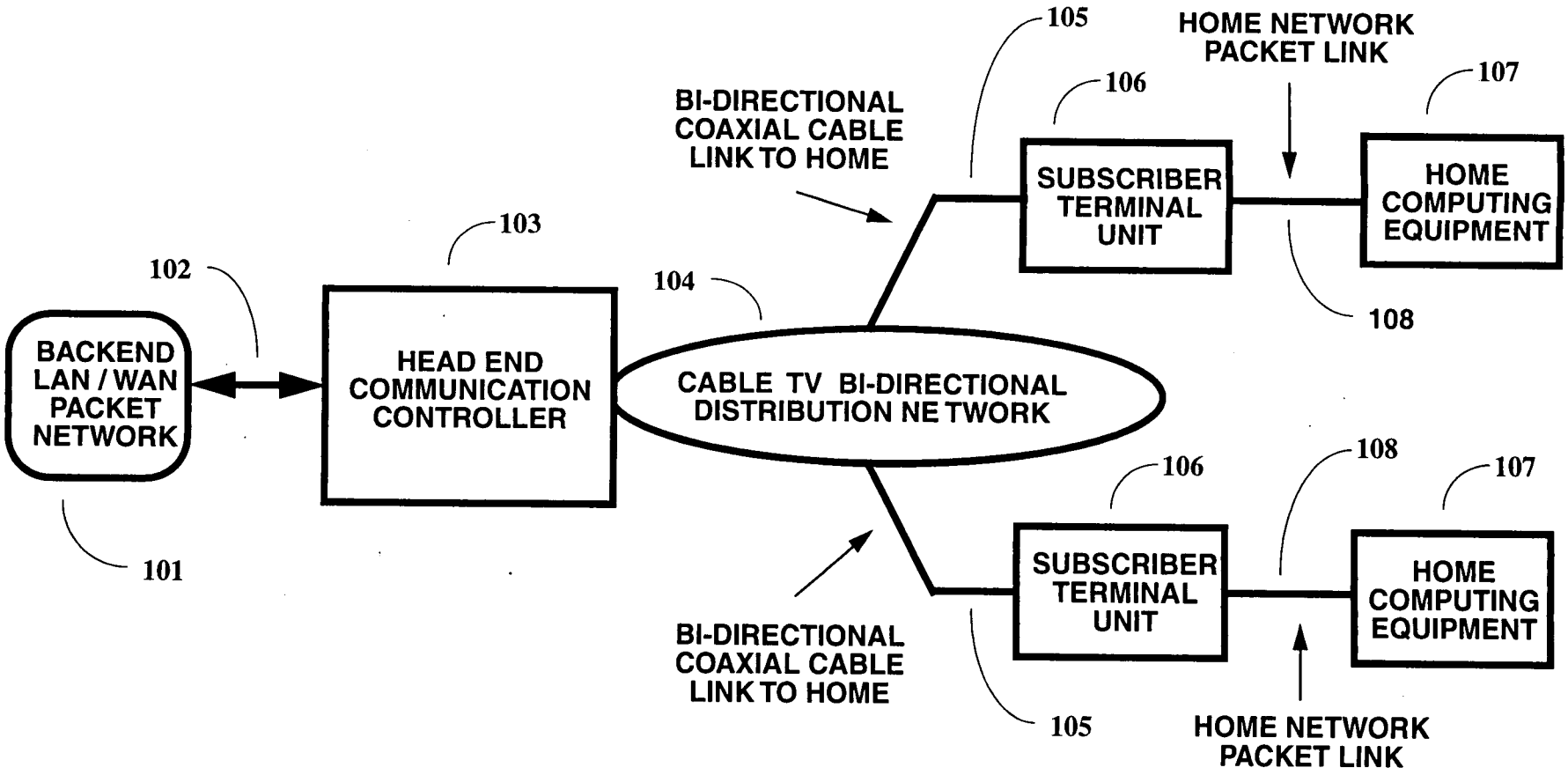
BACKEND LAN / WAN PACKET NETWORK
101
102
HEAD END COMMUNICATION CONTROLLER
103
104
CABLE TV BI-DIRECTIONAL DISTRIBUTION NETWORK
BI-DIRECTIONAL COAXIAL CABLE LINK TO HOME
105
SUBSCRIBER TERMINAL UNIT
106
HOME NETWORK PACKET LINK
107
HOME COMPUTING EQUIPMENT
108
BI-DIRECTIONAL COAXIAL CABLE LINK TO HOME
105
SUBSCRIBER TERMINAL UNIT
106
108
HOME COMPUTING EQUIPMENT
107
HOME NETWORK PACKET LINK

Figure 1.

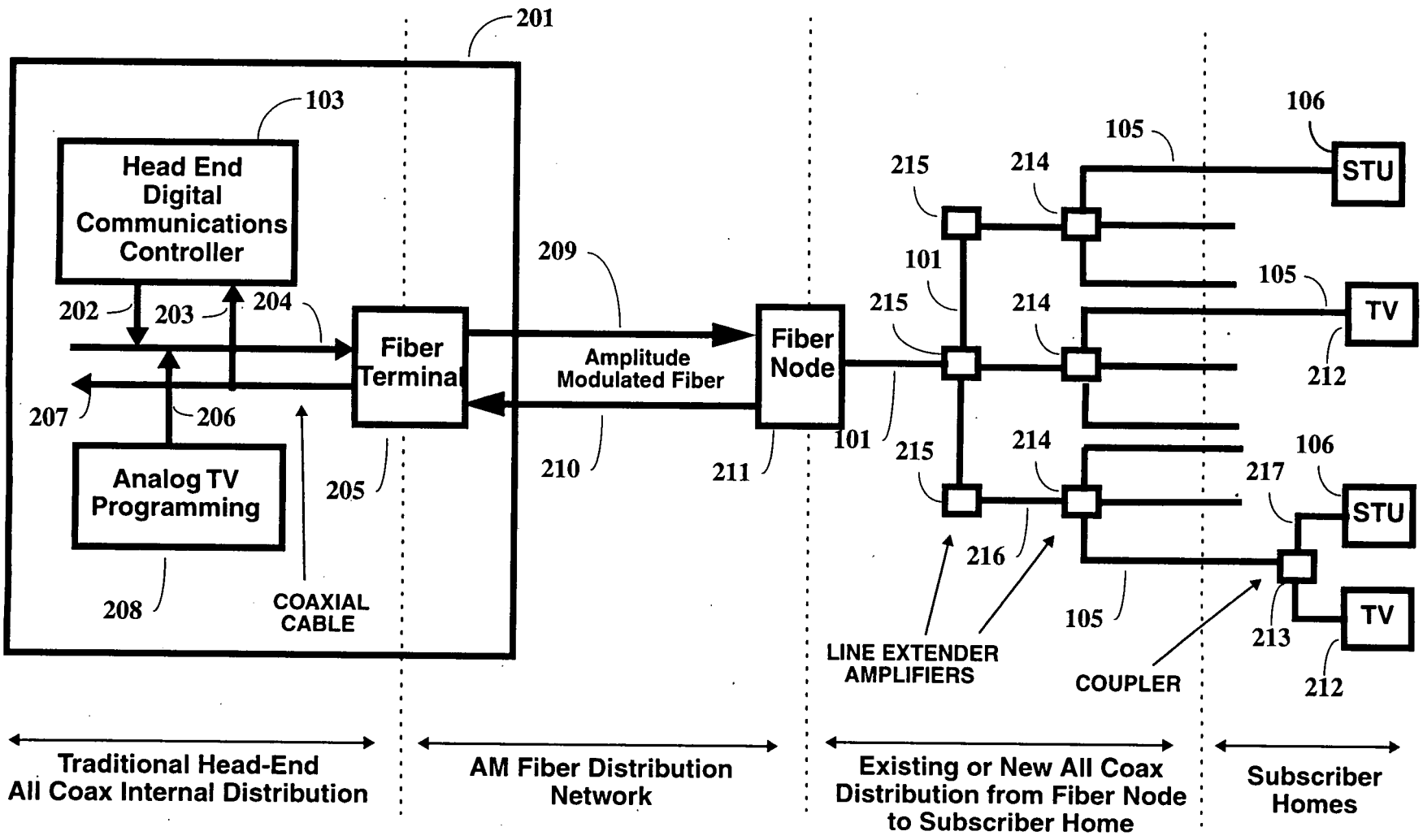
201
103
Head End Digital Communications Controller
202
203
204
207
206
Analog TV Programming
208
205
Fiber Terminal
COAXIAL CABLE
209
Amplitude Modulated Fiber
210
211
Fiber Node
101
215
214
105
106
STU
TV
212
217
213
216
LINE EXTENDER AMPLIFIERS
COUPLER
Traditional Head-End All Coax Internal Distribution
AM Fiber Distribution Network
Existing or New All Coax Distribution from Fiber Node to Subscriber Home
Subscriber Homes

Figure 2.

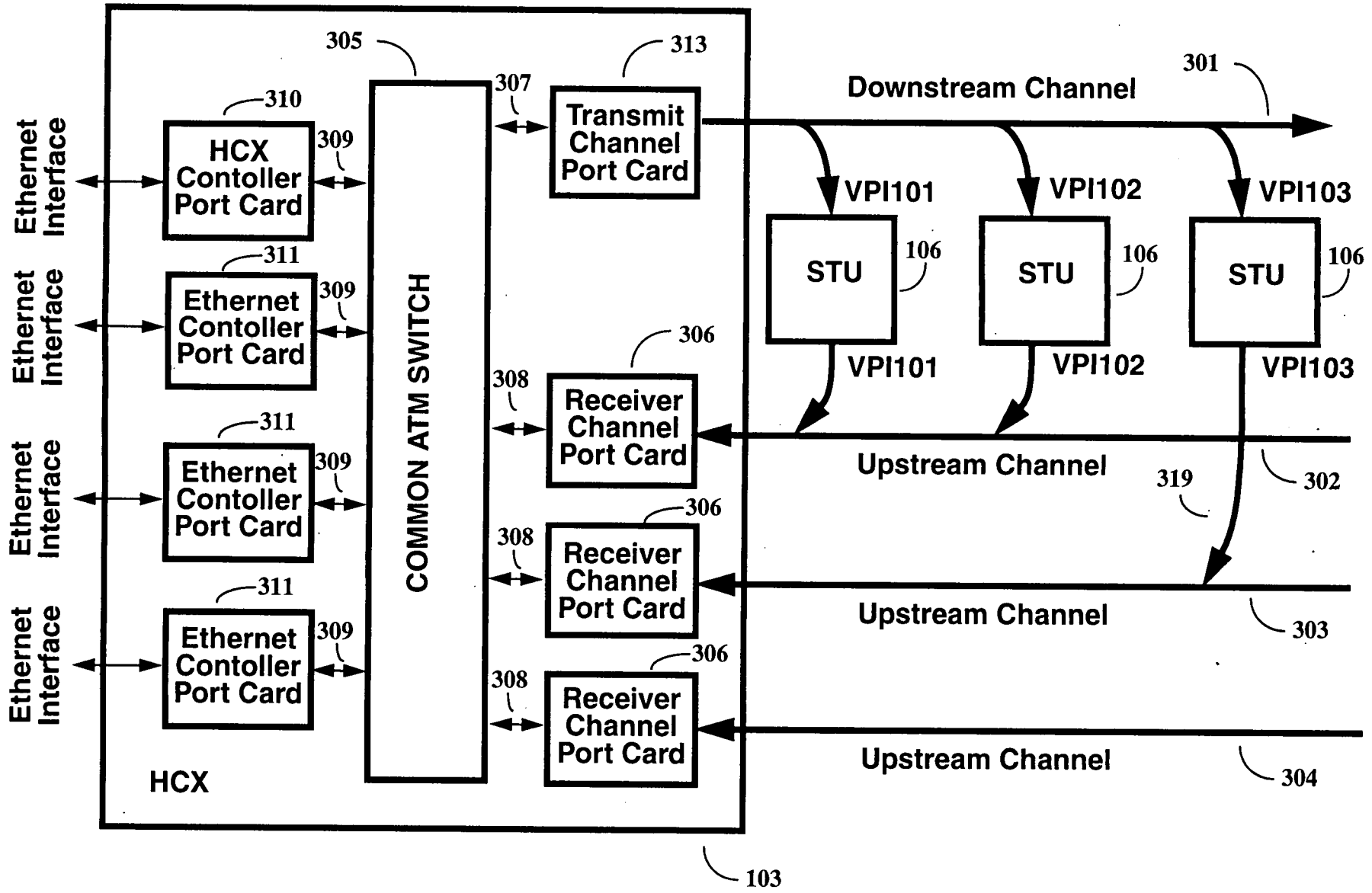
Ethernet Interface
Ethernet Interface
Ethernet Interface
Ethernet Interface
HCX Contoller Port Card
Ethernet Contoller Port Card
Ethernet Contoller Port Card
Ethernet Contoller Port Card
COMMON ATM SWITCH
Transmit Channel Port Card
Receiver Channel Port Card
Receiver Channel Port Card
Receiver Channel Port Card
HCX
Downstream Channel
VPI101
VPI102
VPI103
STU
STU
STU
Upstream Channel
Upstream Channel
Upstream Channel
305
313
307
310
309
311
306
308
301
106
319
302
303
304
103

Figure 3.

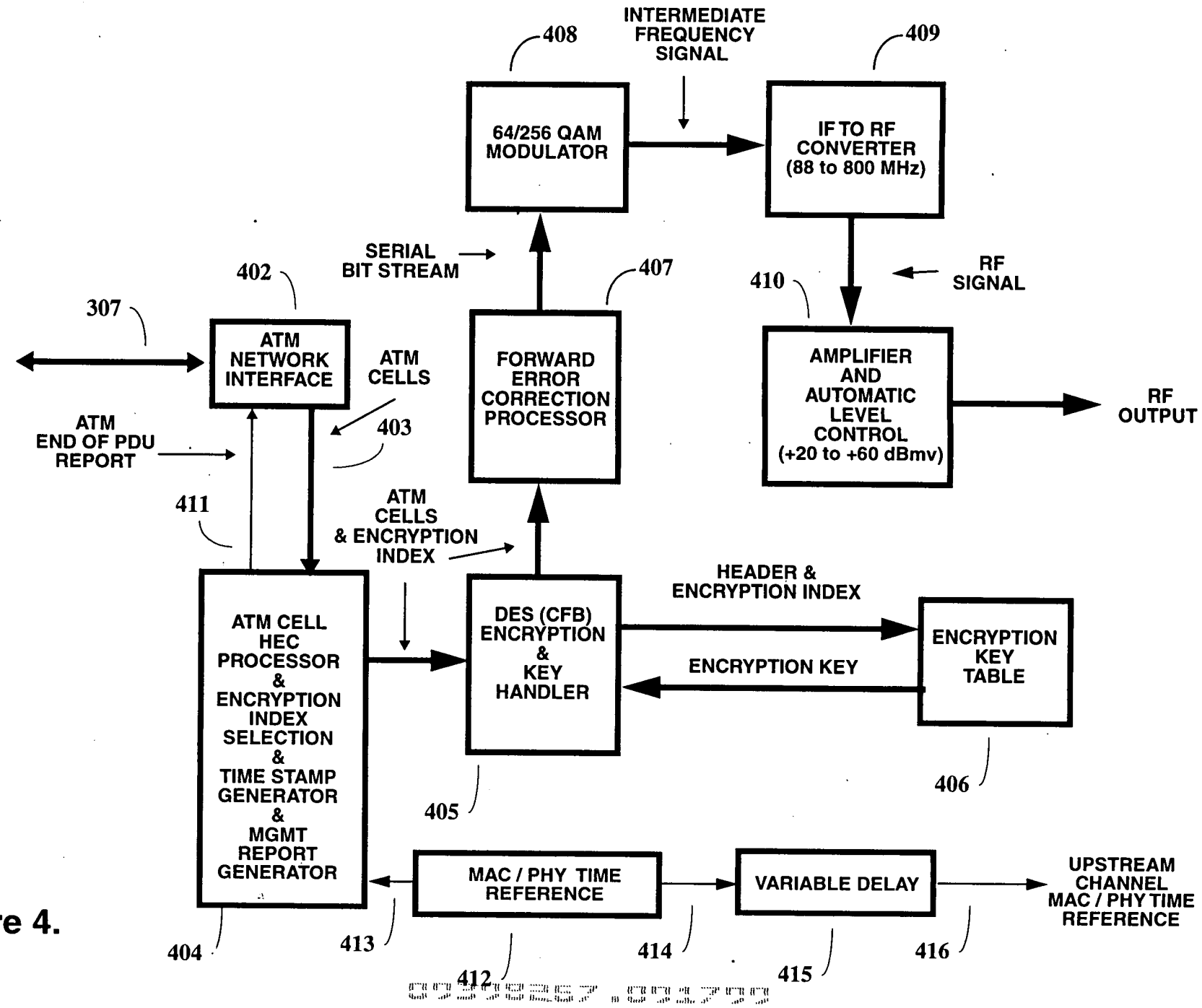
INTERMEDIATE FREQUENCY SIGNAL
408
409
64/256 QAM MODULATOR
IF TO RF CONVERTER (88 to 800 MHz)
SERIAL BIT STREAM
402
407
410
RF SIGNAL
307
ATM NETWORK INTERFACE
ATM CELLS
FORWARD ERROR CORRECTION PROCESSOR
AMPLIFIER AND AUTOMATIC LEVEL CONTROL (+20 to +60 dBmv)
RF OUTPUT
ATM END OF PDU REPORT
403
411
ATM CELLS & ENCRYPTION INDEX
HEADER & ENCRYPTION INDEX
ATM CELL HEC PROCESSOR & ENCRYPTION INDEX SELECTION & TIME STAMP GENERATOR & MGMT REPORT GENERATOR
DES (CFB) ENCRYPTION & KEY HANDLER
ENCRYPTION KEY
ENCRYPTION KEY TABLE
405
406
MAC / PHY TIME REFERENCE
VARIABLE DELAY
UPSTREAM CHANNEL MAC / PHY TIME REFERENCE
404
413
414
416
412
415

Figure 4.

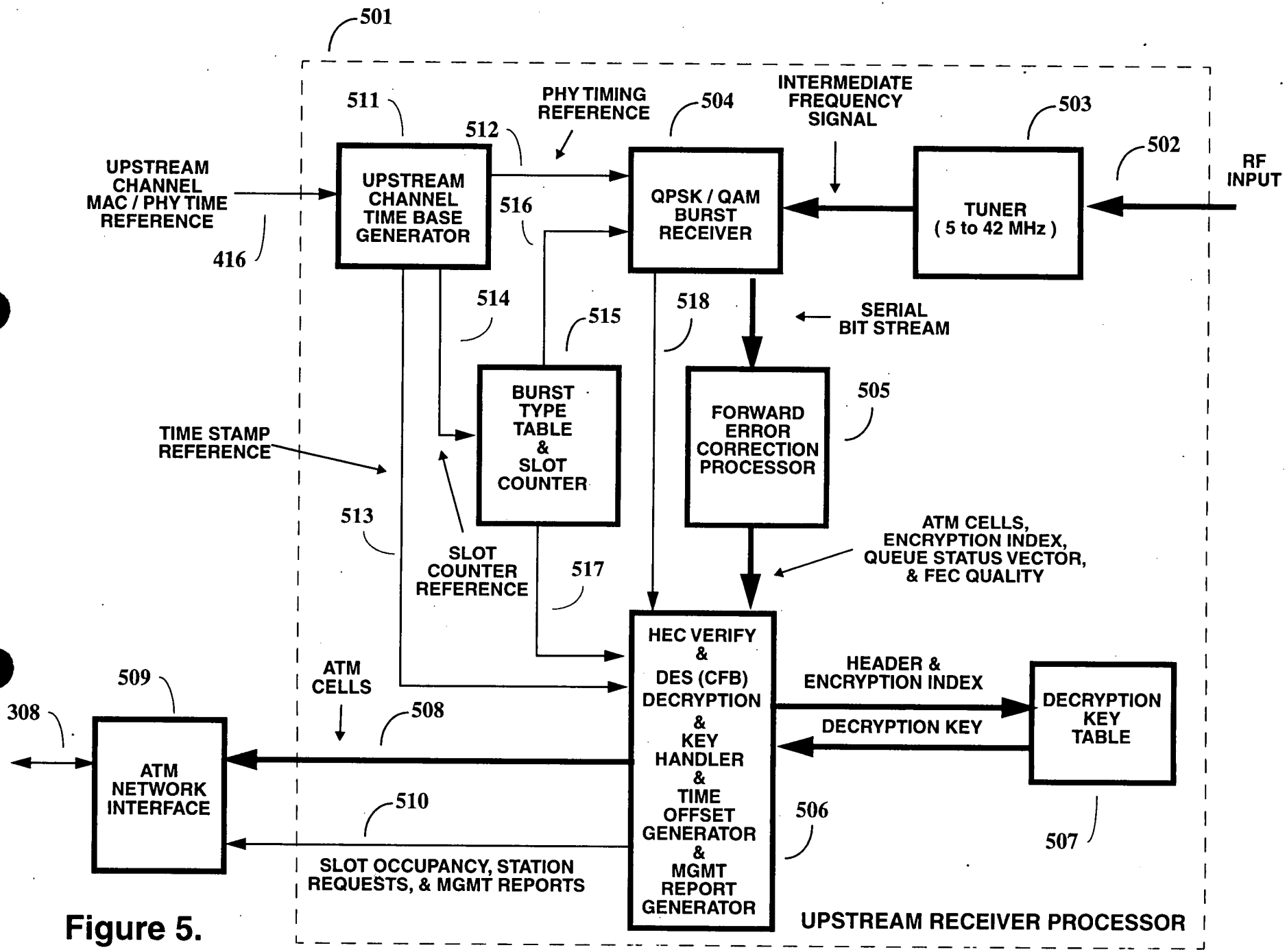
501
511
512
PHY TIMING REFERENCE
504
INTERMEDIATE FREQUENCY SIGNAL
503
502
RF INPUT
UPSTREAM CHANNEL MAC / PHY TIME REFERENCE
416
UPSTREAM CHANNEL TIME BASE GENERATOR
516
QPSK / QAM BURST RECEIVER
TUNER (5 to 42 MHz)
514
515
518
SERIAL BIT STREAM
BURST TYPE TABLE & SLOT COUNTER
FORWARD ERROR CORRECTION PROCESSOR
505
TIME STAMP REFERENCE
513
SLOT COUNTER REFERENCE
517
ATM CELLS, ENCRYPTION INDEX, QUEUE STATUS VECTOR, & FEC QUALITY
HEC VERIFY & DES (CFB) DECRYPTION & KEY HANDLER & TIME OFFSET GENERATOR & MGMT REPORT GENERATOR
ATM CELLS
509
308
508
HEADER & ENCRYPTION INDEX
DECRYPTION KEY
DECRYPTION KEY TABLE
ATM NETWORK INTERFACE
510
506
507
SLOT OCCUPANCY, STATION REQUESTS, & MGMT REPORTS
UPSTREAM RECEIVER PROCESSOR

Figure 5.

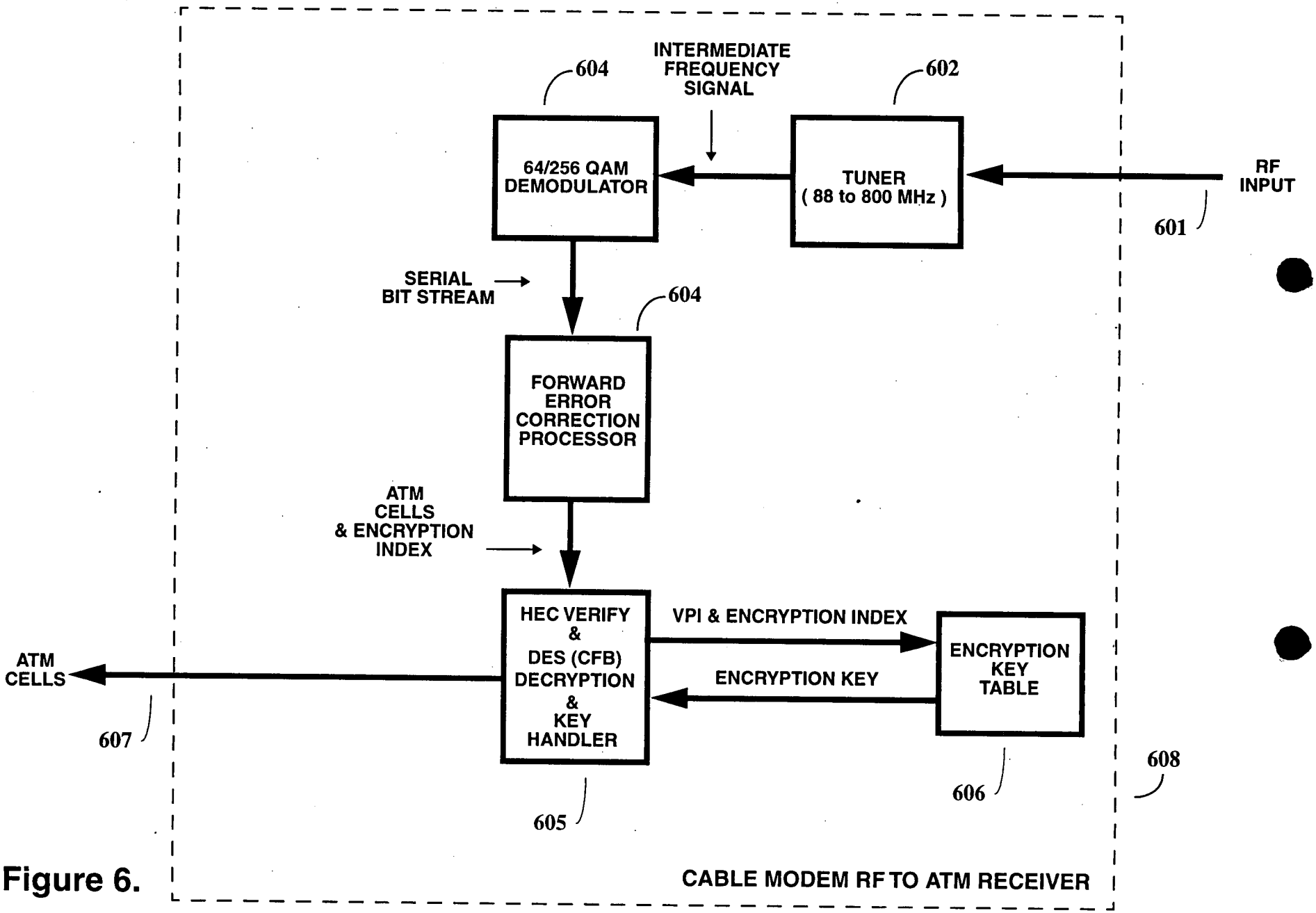
INTERMEDIATE FREQUENCY SIGNAL
604
602
64/256 QAM DEMODULATOR
TUNER (88 to 800 MHz)
RF INPUT
601
SERIAL BIT STREAM
604
FORWARD ERROR CORRECTION PROCESSOR
ATM CELLS & ENCRYPTION INDEX
HEC VERIFY & DES (CFB) DECRYPTION & KEY HANDLER
VPI & ENCRYPTION INDEX
ENCRYPTION KEY
ENCRYPTION KEY TABLE
ATM CELLS
607
605
606
608
CABLE MODEM RF TO ATM RECEIVER

Figure 6.

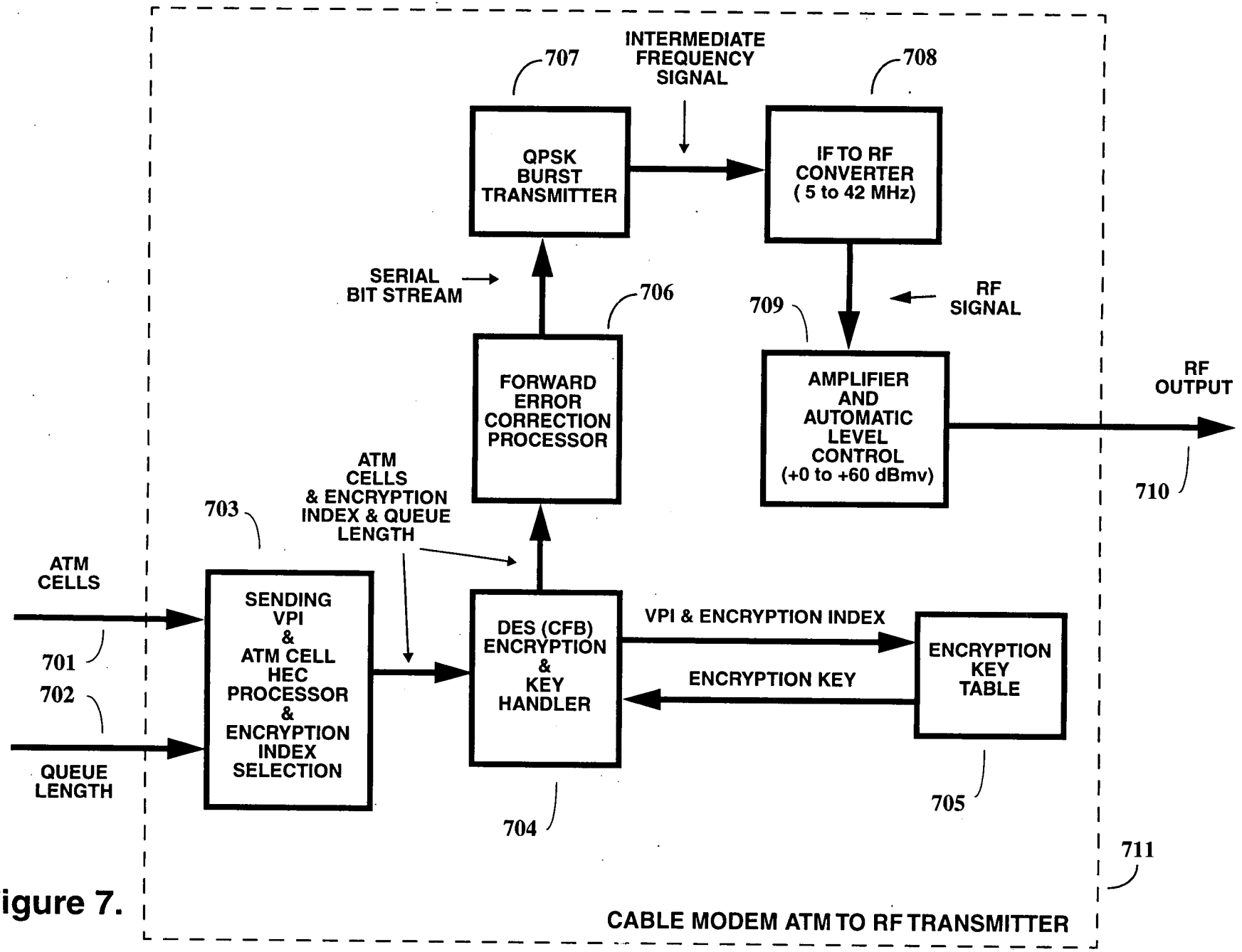
INTERMEDIATE FREQUENCY SIGNAL
707
708
QPSK BURST TRANSMITTER
IF TO RF CONVERTER (5 to 42 MHz)
SERIAL BIT STREAM
706
709
RF SIGNAL
FORWARD ERROR CORRECTION PROCESSOR
AMPLIFIER AND AUTOMATIC LEVEL CONTROL (+0 to +60 dBmv)
RF OUTPUT
710
ATM CELLS & ENCRYPTION INDEX & QUEUE LENGTH
703
ATM CELLS
701
702
QUEUE LENGTH
SENDING VPI & ATM CELL HEC PROCESSOR & ENCRYPTION INDEX SELECTION
DES (CFB) ENCRYPTION & KEY HANDLER
VPI & ENCRYPTION INDEX
ENCRYPTION KEY
ENCRYPTION KEY TABLE
704
705
711
CABLE MODEM ATM TO RF TRANSMITTER

Figure 7.

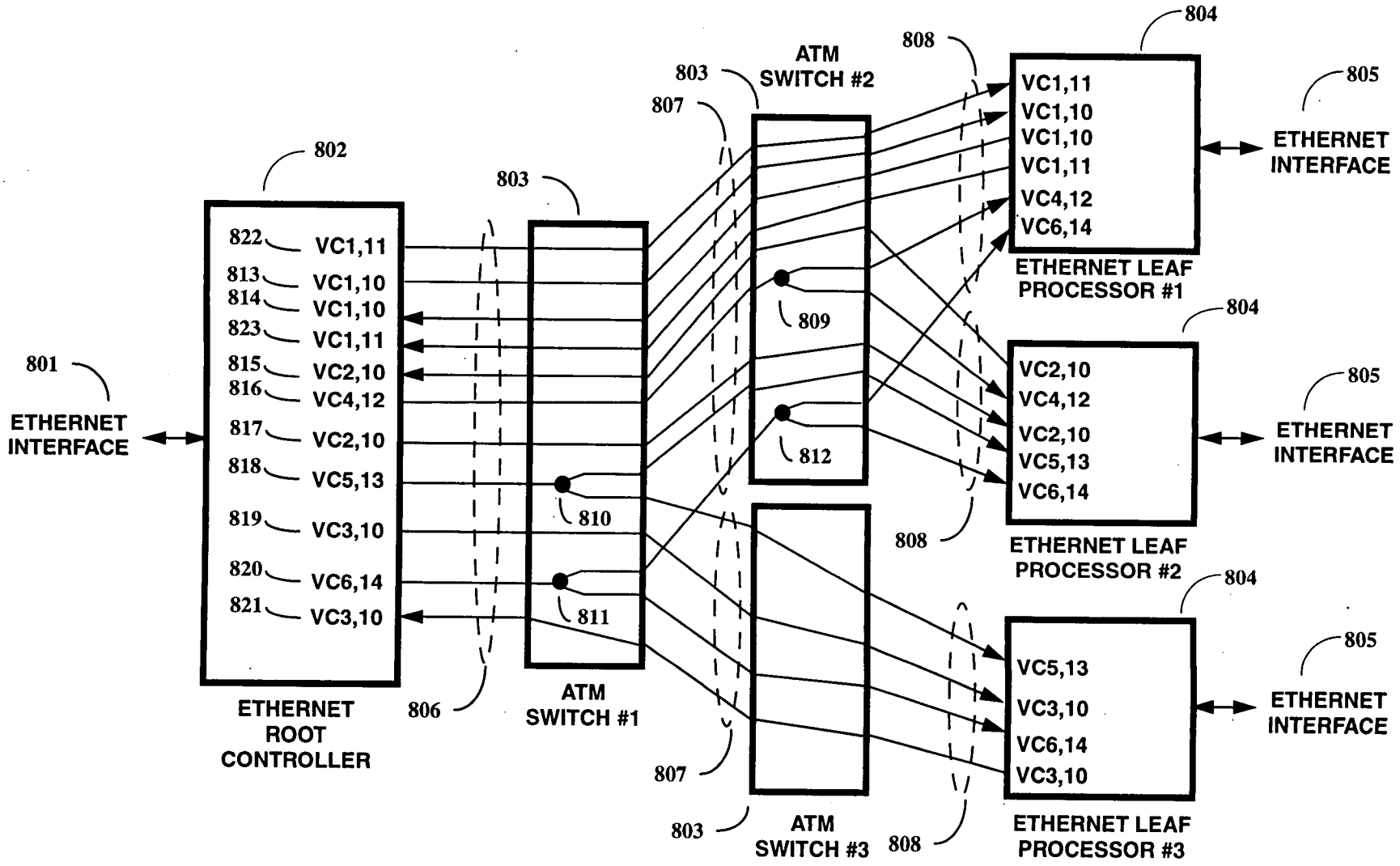
801
ETHERNET INTERFACE
802
ETHERNET ROOT CONTROLLER
822 VC1,11
813 VC1,10
814 VC1,10
823 VC1,11
815 VC2,10
816 VC4,12
817 VC2,10
818 VC5,13
819 VC3,10
820 VC6,14
821 VC3,10
806
803
ATM SWITCH #1
810
811
807
803
ATM SWITCH #2
809
812
807
803
ATM SWITCH #3
808
808
808
804
VC1,11
VC1,10
VC1,10
VC1,11
VC4,12
VC6,14
ETHERNET LEAF PROCESSOR #1
805
ETHERNET INTERFACE
804
VC2,10
VC4,12
VC2,10
VC5,13
VC6,14
ETHERNET LEAF PROCESSOR #2
805
ETHERNET INTERFACE
804
VC5,13
VC3,10
VC6,14
VC3,10
ETHERNET LEAF PROCESSOR #3
805
ETHERNET INTERFACE

Figure 8.

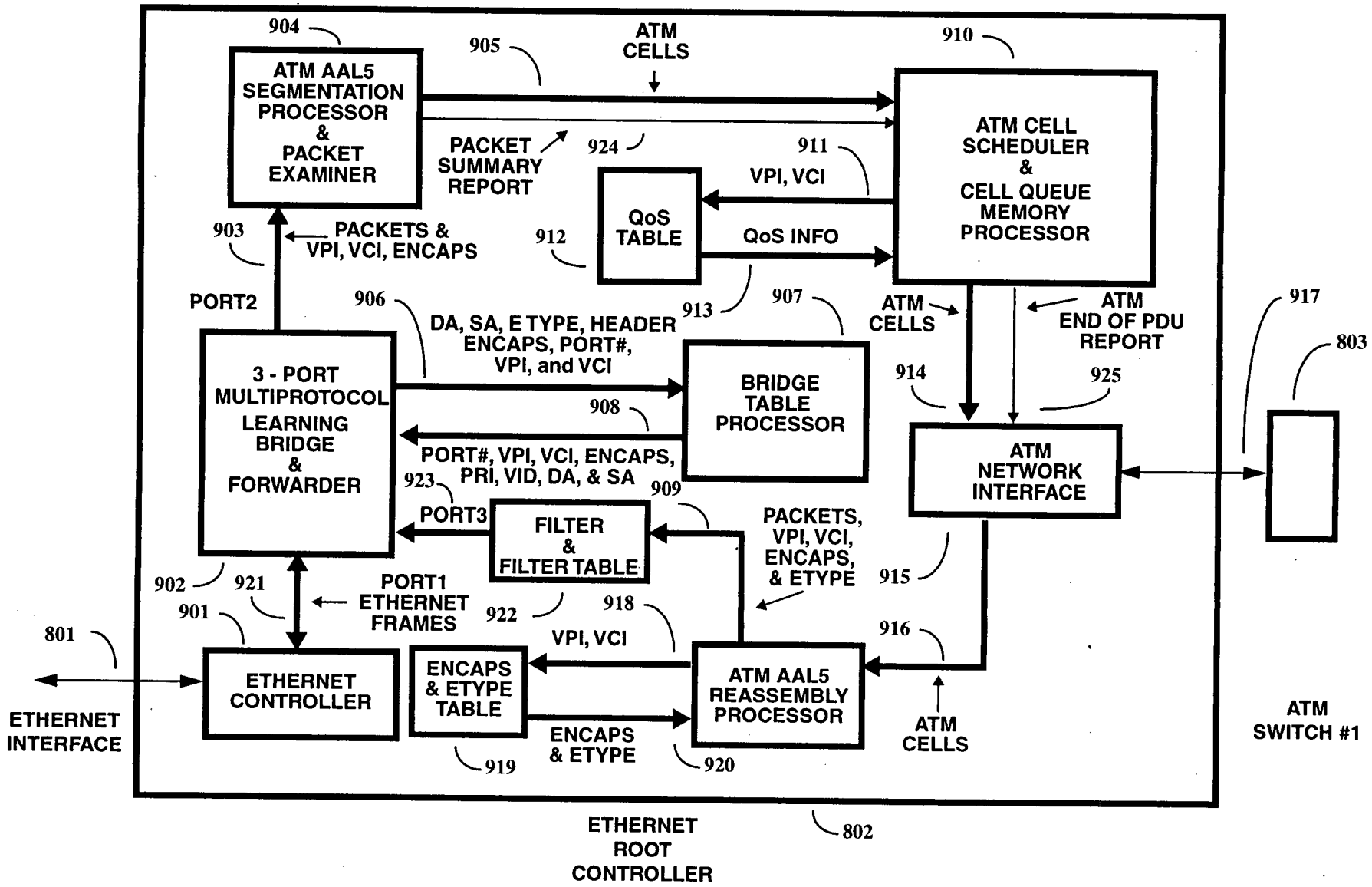
904
ATM AAL5 SEGMENTATION PROCESSOR & PACKET EXAMINER
905
ATM CELLS
910
ATM CELL SCHEDULER & CELL QUEUE MEMORY PROCESSOR
PACKET SUMMARY REPORT
924
911
VPI, VCI
QoS TABLE
QoS INFO
912
903
PACKETS & VPI, VCI, ENCAPS
PORT2
906
DA, SA, E TYPE, HEADER ENCAPS, PORT#, VPI, and VCI
913
907
ATM CELLS
ATM END OF PDU REPORT
917
803
914
925
3 - PORT MULTIPROTOCOL LEARNING BRIDGE & FORWARDER
908
BRIDGE TABLE PROCESSOR
PORT#, VPI, VCI, ENCAPS, PRI, VID, DA, & SA
ATM NETWORK INTERFACE
923
909
PORT3
FILTER & FILTER TABLE
PACKETS, VPI, VCI, ENCAPS, & ETYPE
915
902
921
PORT1 ETHERNET FRAMES
922
918
901
916
801
VPI, VCI
ETHERNET CONTROLLER
ENCAPS & ETYPE TABLE
ATM AAL5 REASSEMBLY PROCESSOR
ATM CELLS
ATM SWITCH #1
ETHERNET INTERFACE
ENCAPS & ETYPE
919
920
ETHERNET ROOT CONTROLLER
802

Figure 9.

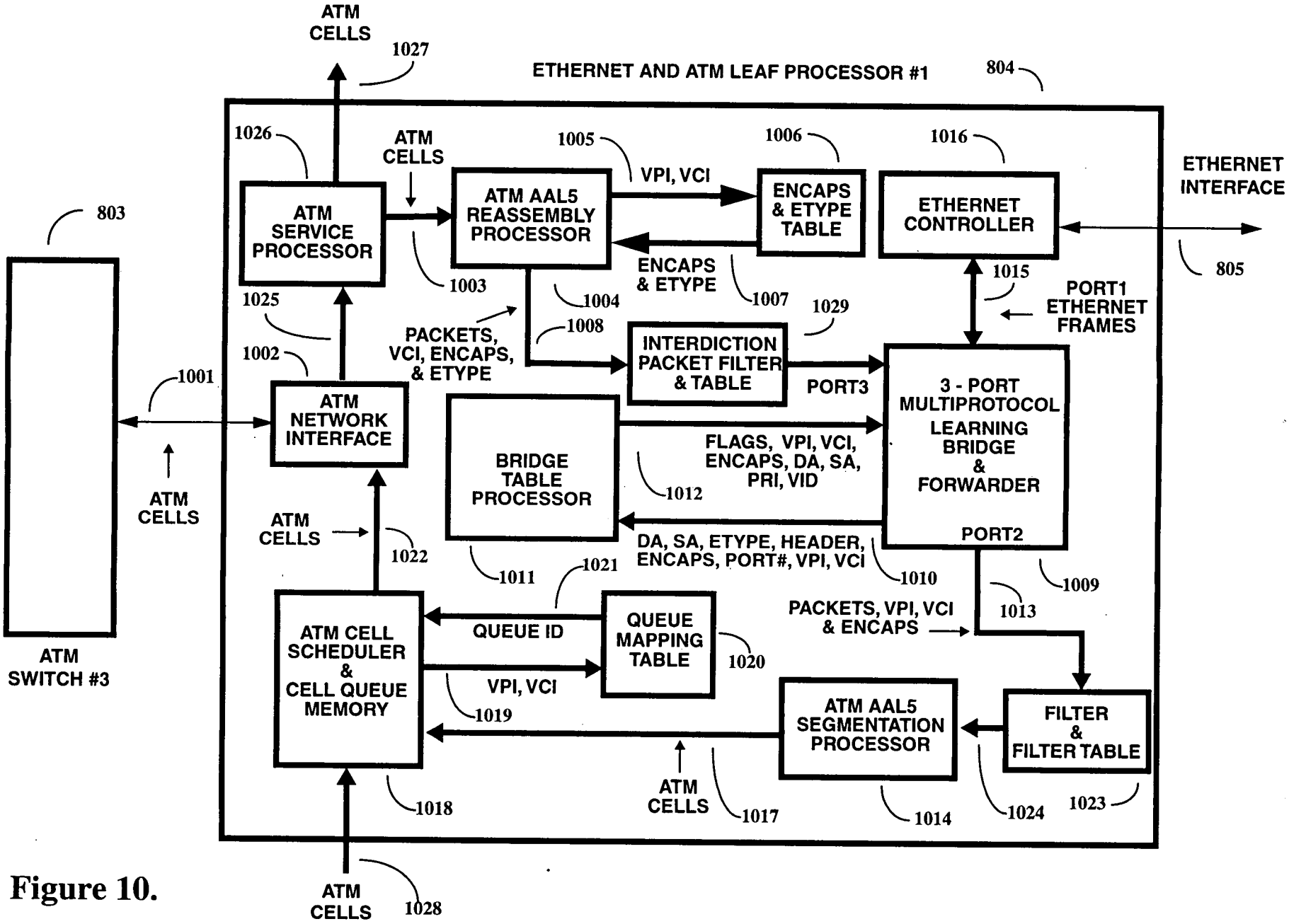
ATM CELLS
1027
ETHERNET AND ATM LEAF PROCESSOR #1
804
1026
ATM CELLS
1005
VPI, VCI
1006
1016
ETHERNET INTERFACE
803
ATM SERVICE PROCESSOR
ATM AAL5 REASSEMBLY PROCESSOR
ENCAPS & ETYPE TABLE
ETHERNET CONTROLLER
805
1003
ENCAPS & ETYPE
1007
1015
1004
1025
1029
PORT1 ETHERNET FRAMES
PACKETS, VCI, ENCAPS, & ETYPE
1008
INTERDICTION PACKET FILTER & TABLE
1002
1001
ATM NETWORK INTERFACE
PORT3
3 - PORT MULTIPROTOCOL LEARNING BRIDGE & FORWARDER
BRIDGE TABLE PROCESSOR
FLAGS, VPI, VCI, ENCAPS, DA, SA, PRI, VID
1012
ATM CELLS
ATM CELLS
1022
DA, SA, ETYPE, HEADER, ENCAPS, PORT#, VPI, VCI
1011
1021
1010
PORT2
1009
1013
PACKETS, VPI, VCI & ENCAPS
ATM SWITCH #3
ATM CELL SCHEDULER & CELL QUEUE MEMORY
QUEUE ID
QUEUE MAPPING TABLE
1020
VPI, VCI
1019
ATM AAL5 SEGMENTATION PROCESSOR
FILTER & FILTER TABLE
ATM CELLS
1017
1018
1014
1024
1023
ATM CELLS
1028

Figure 10.

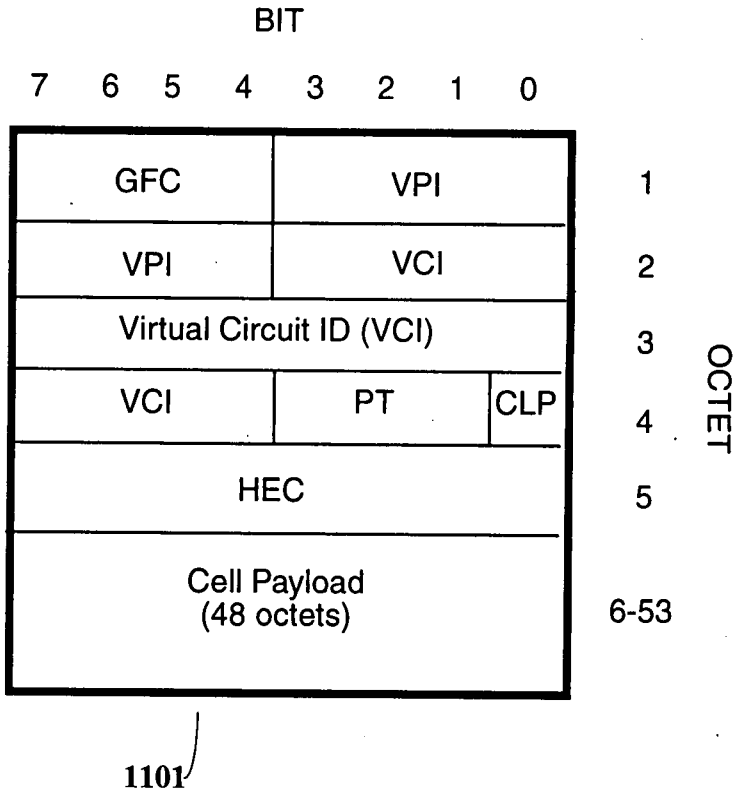
BIT
7 6 5 4 3 2 1 0
GFC
VPI
VPI
VCI
Virtual Circuit ID (VCI)
VCI
PT
CLP
HEC
Cell Payload
(48 octets)
1
2
3
4
5
6-53
OCTET
1101

Figure 11.

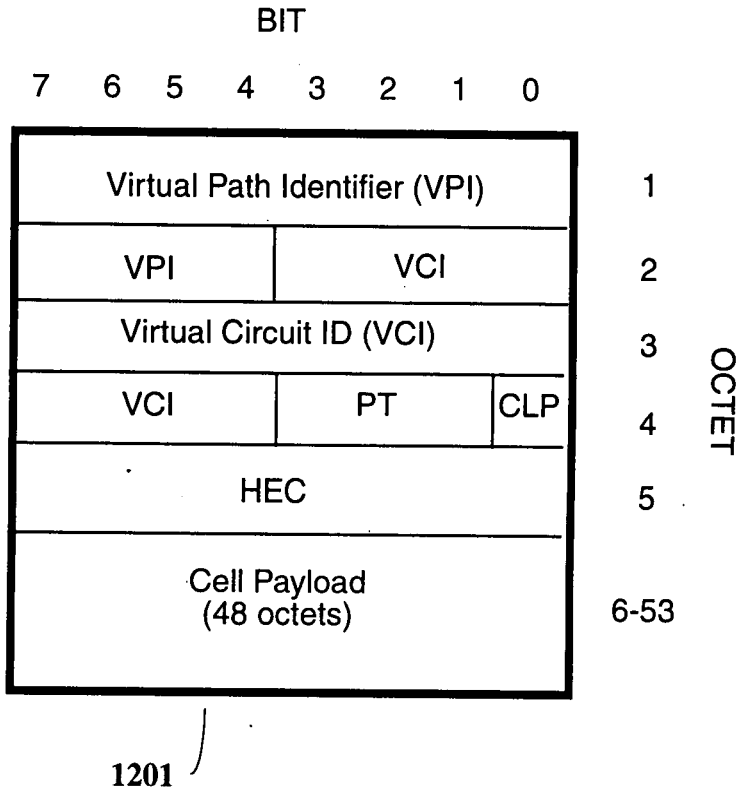
BIT
7 6 5 4 3 2 1 0
Virtual Path Identifier (VPI)
VPI
VCI
Virtual Circuit ID (VCI)
VCI
PT
CLP
HEC
Cell Payload
(48 octets)
1
2
3
4
5
6-53
OCTET
1201

Figure 12.

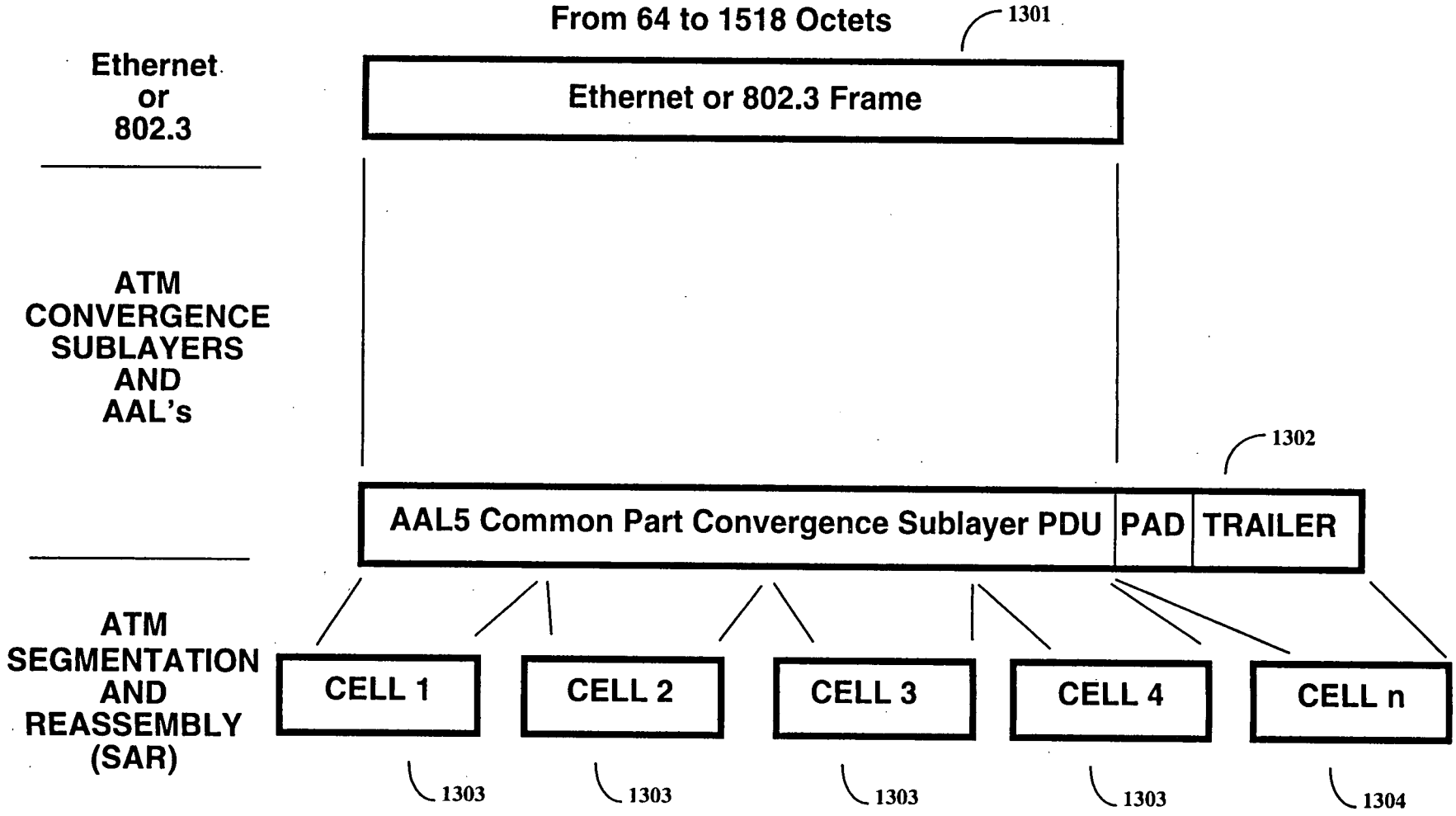
From 64 to 1518 Octets
1301
Ethernet or 802.3 Frame
Ethernet or 802.3
ATM CONVERGENCE SUBLAYERS AND AAL's
1302
AAL5 Common Part Convergence Sublayer PDU
PAD
TRAILER
ATM SEGMENTATION AND REASSEMBLY (SAR)
CELL 1
CELL 2
CELL 3
CELL 4
CELL n
1303
1303
1303
1303
1304

Figure 13.

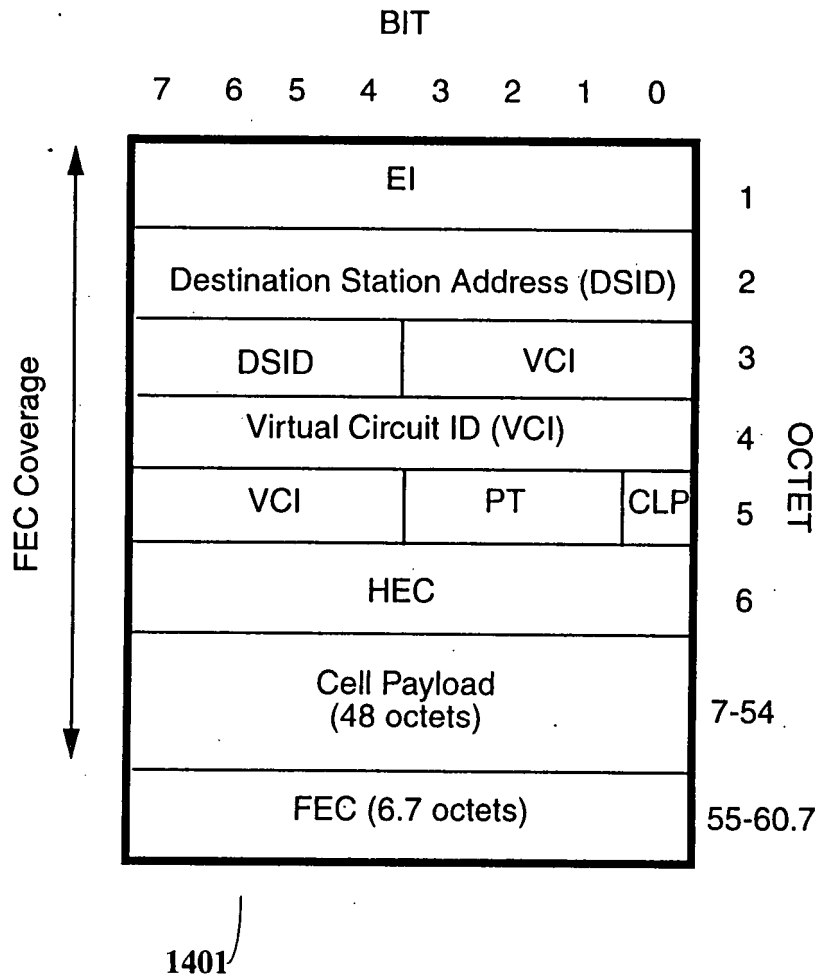
BIT
7 6 5 4 3 2 1 0
EI
Destination Station Address (DSID)
DSID
VCI
Virtual Circuit ID (VCI)
VCI
PT
CLP
HEC
Cell Payload
(48 octets)
FEC (6.7 octets)
FEC Coverage
1
2
3
4
5
6
7-54
55-60.7
OCTET
1401

Figure 14.

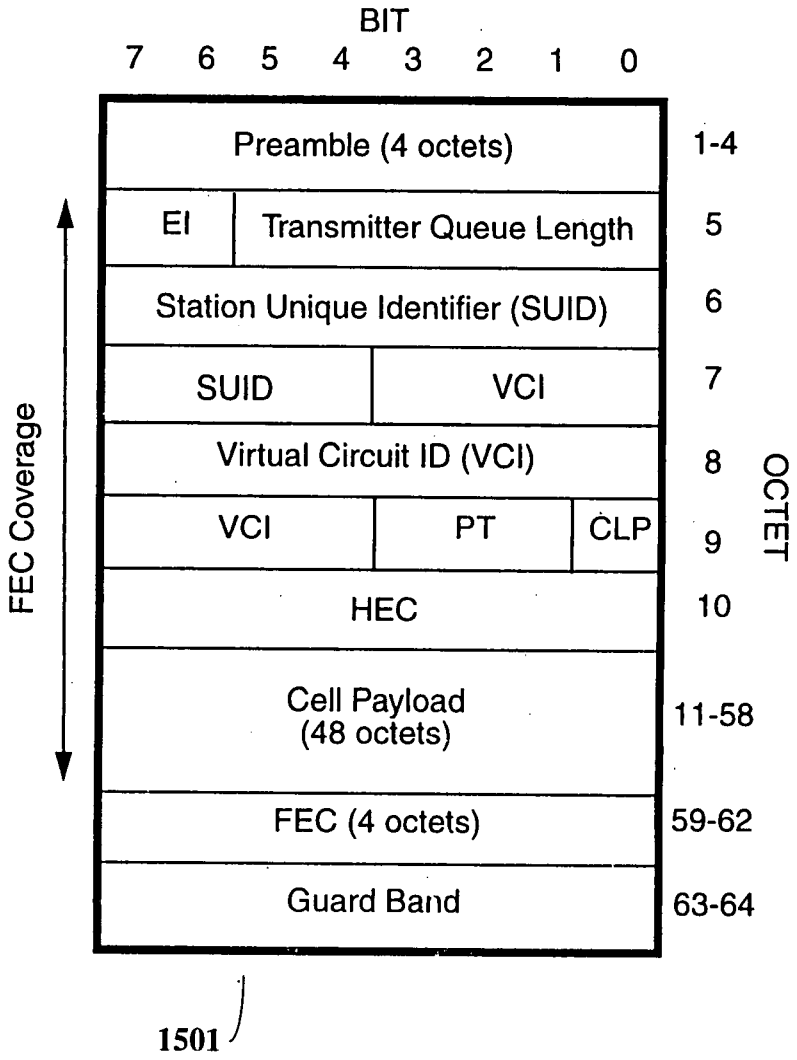
BIT
7 6 5 4 3 2 1 0
Preamble (4 octets)
1-4
EI
Transmitter Queue Length
5
Station Unique Identifier (SUID)
6
SUID
VCI
7
Virtual Circuit ID (VCI)
8
VCI
PT
CLP
9
HEC
10
Cell Payload
(48 octets)
11-58
FEC (4 octets)
59-62
Guard Band
63-64
FEC Coverage
OCTET
1501

Figure 15.

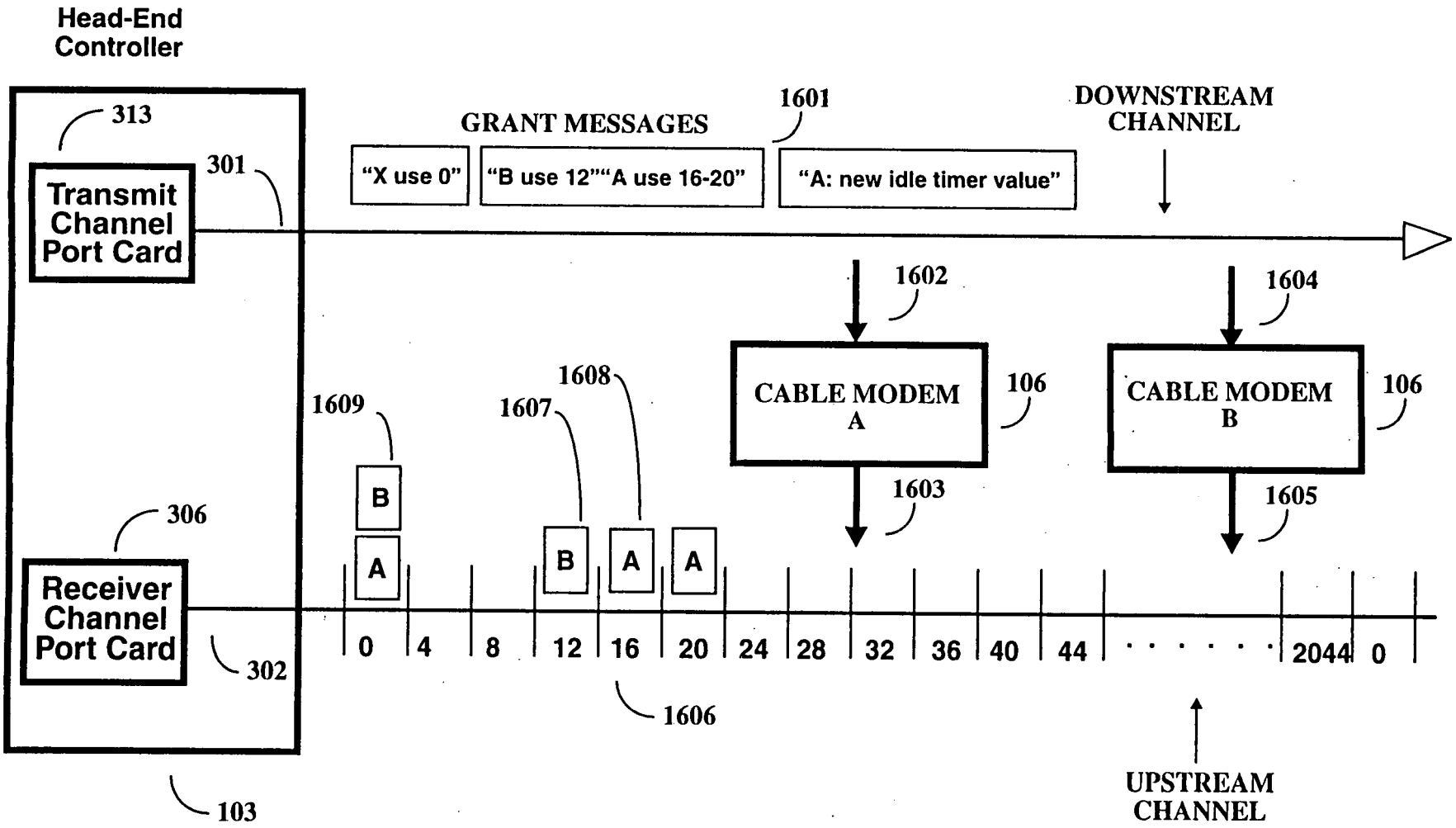
Head-End Controller
313
Transmit Channel Port Card
301
306
Receiver Channel Port Card
302
103
GRANT MESSAGES
1601
"X use 0"
"B use 12""A use 16-20"
"A: new idle timer value"
DOWNSTREAM CHANNEL
1602
1604
CABLE MODEM A
106
CABLE MODEM B
106
1603
1605
1609
1607
1608
B
A
B
A
A
0
4
8
12
16
20
24
28
32
36
40
44
2044
0
1606
UPSTREAM CHANNEL

Figure 16

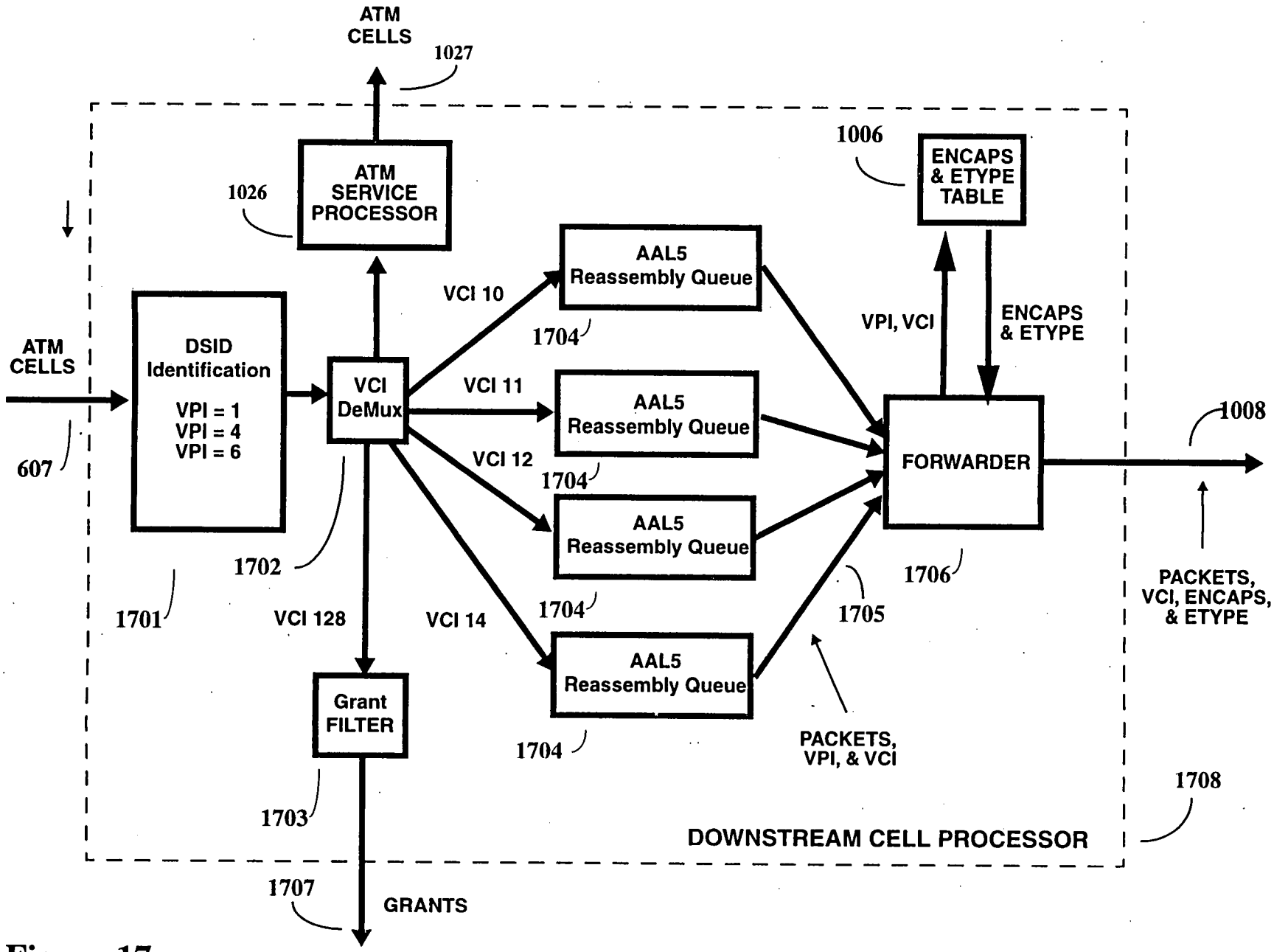
ATM CELLS
1027
ATM SERVICE PROCESSOR
1026
1006
ENCAPS & ETYPE TABLE
AAL5 Reassembly Queue
VCI 10
1704
VPI, VCI
ENCAPS & ETYPE
ATM CELLS
DSID Identification
VPI = 1
VPI = 4
VPI = 6
VCI DeMux
VCI 11
AAL5 Reassembly Queue
1008
607
VCI 12
1704
FORWARDER
AAL5 Reassembly Queue
1702
1706
PACKETS, VCI, ENCAPS, & ETYPE
1701
VCI 128
VCI 14
1704
1705
AAL5 Reassembly Queue
Grant FILTER
PACKETS, VPI, & VCI
1704
1708
1703
DOWNSTREAM CELL PROCESSOR
1707
GRANTS

Figure 17.

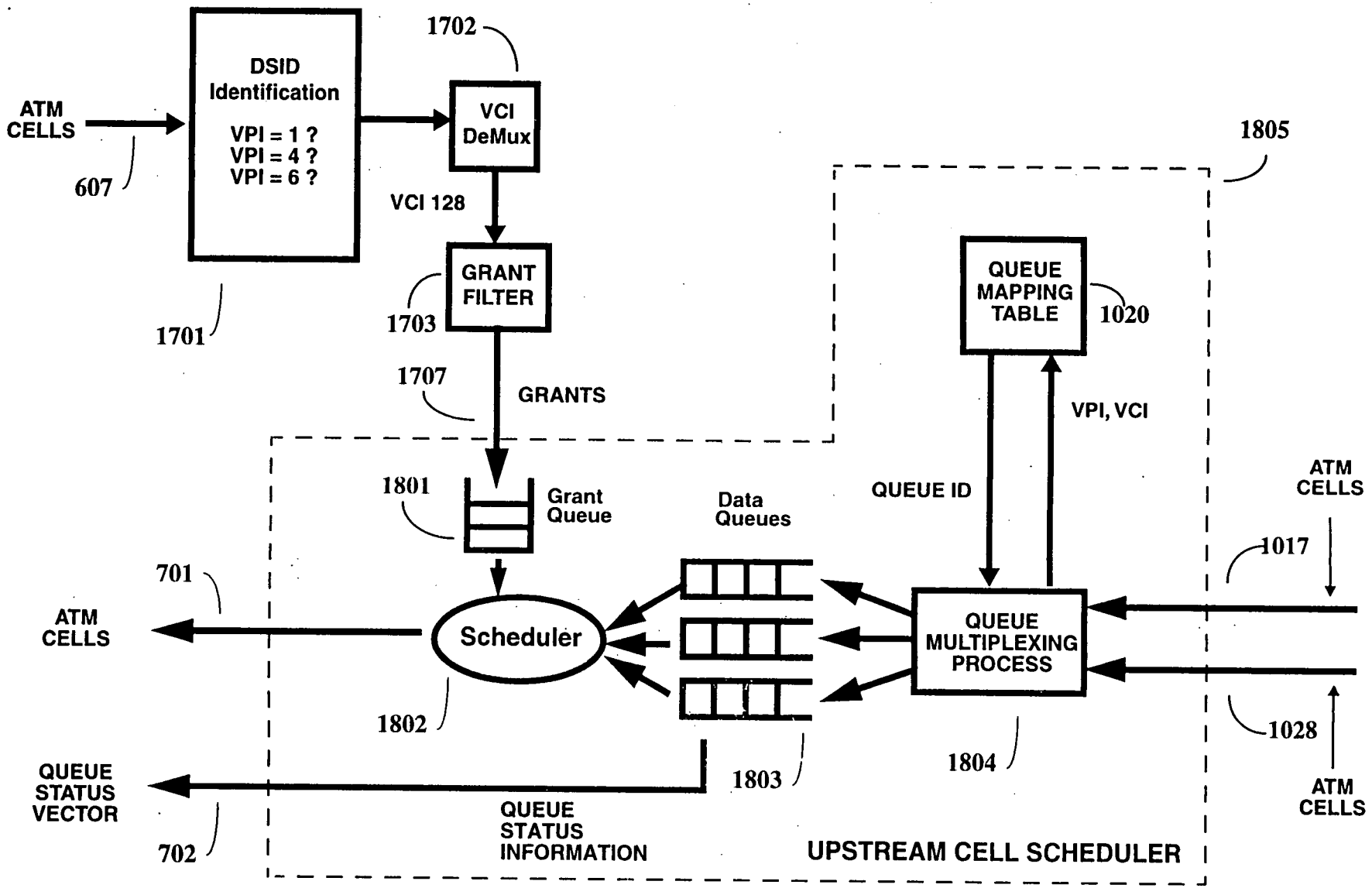
ATM CELLS
607
DSID Identification
VPI = 1 ?
VPI = 4 ?
VPI = 6 ?
1701
1702
VCI DeMux
VCI 128
GRANT FILTER
1703
1707
GRANTS
1805
QUEUE MAPPING TABLE
1020
VPI, VCI
QUEUE ID
1801
Grant Queue
Data Queues
ATM CELLS
1017
701
ATM CELLS
Scheduler
QUEUE MULTIPLEXING PROCESS
1802
1803
1804
1028
ATM CELLS
QUEUE STATUS VECTOR
702
QUEUE STATUS INFORMATION
UPSTREAM CELL SCHEDULER

Figure 18.

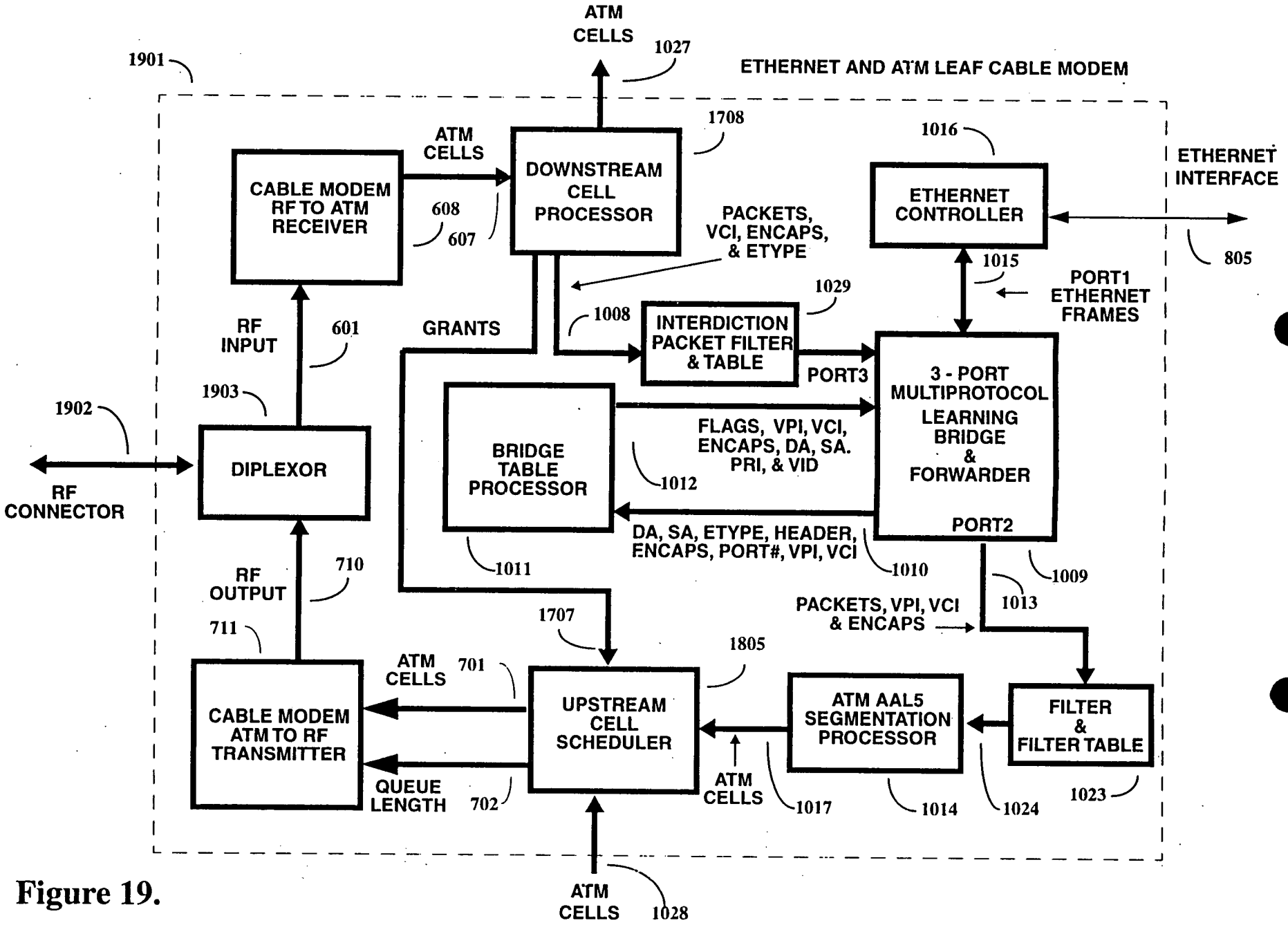
ATM CELLS
1027
1901
ETHERNET AND ATM LEAF CABLE MODEM
1708
ATM CELLS
CABLE MODEM RF TO ATM RECEIVER
608
607
DOWNSTREAM CELL PROCESSOR
1016
ETHERNET CONTROLLER
ETHERNET INTERFACE
805
PACKETS, VCI, ENCAPS, & ETYPE
1015
PORT1 ETHERNET FRAMES
1029
1008
INTERDICTION PACKET FILTER & TABLE
PORT3
3 - PORT MULTIPROTOCOL LEARNING BRIDGE & FORWARDER
PORT2
RF INPUT
601
GRANTS
1903
1902
DIPLEXOR
RF CONNECTOR
BRIDGE TABLE PROCESSOR
FLAGS, VPI, VCI, ENCAPS, DA, SA. PRI, & VID
1012
DA, SA, ETYPE, HEADER, ENCAPS, PORT#, VPI, VCI
1010
1009
1011
RF OUTPUT
710
1013
PACKETS, VPI, VCI & ENCAPS
1707
711
1805
ATM CELLS
701
CABLE MODEM ATM TO RF TRANSMITTER
UPSTREAM CELL SCHEDULER
ATM AAL5 SEGMENTATION PROCESSOR
FILTER & FILTER TABLE
QUEUE LENGTH
702
ATM CELLS
1017
1014
1024
1023
ATM CELLS
1028

Figure 19.

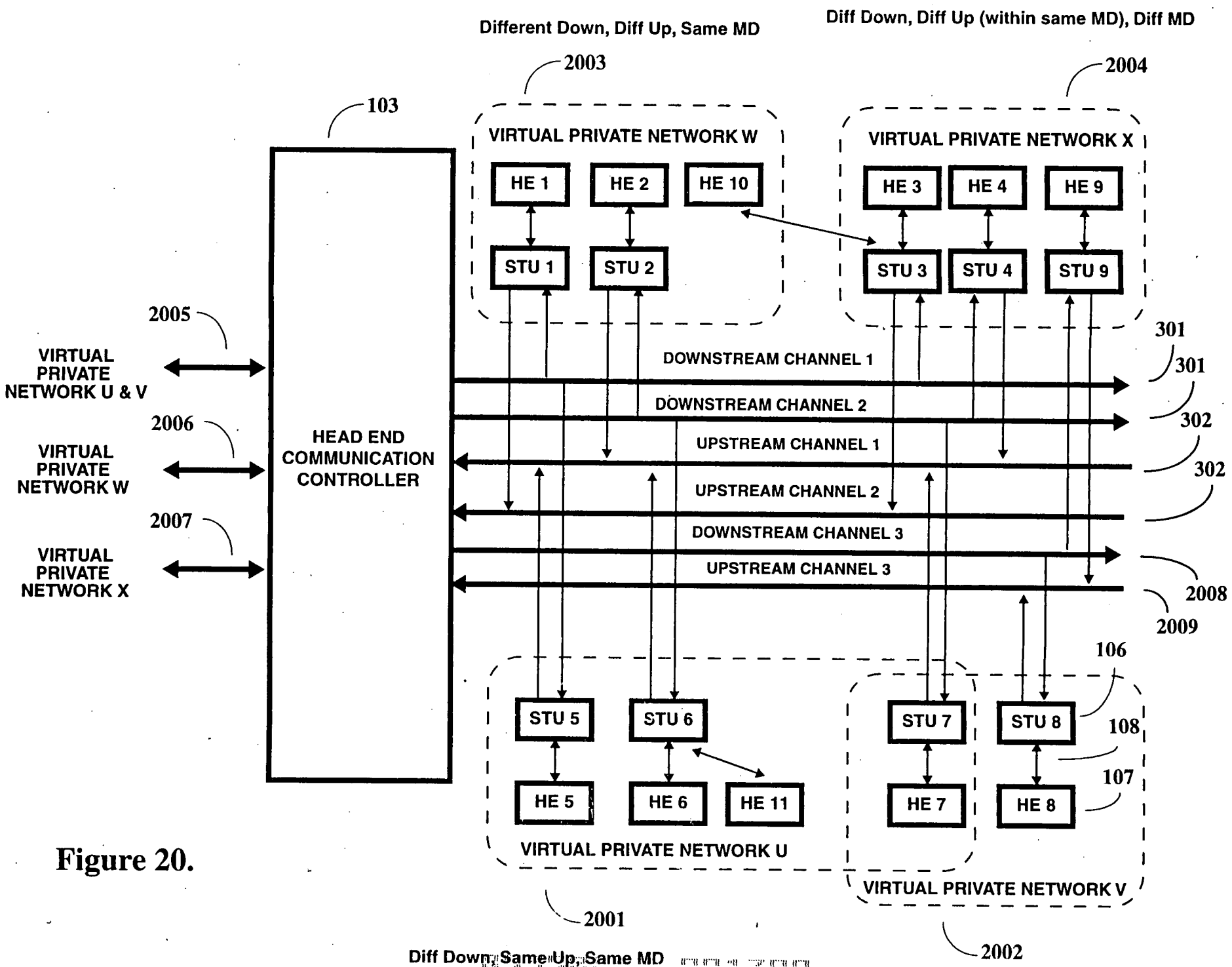
Different Down, Diff Up, Same MD
Diff Down, Diff Up (within same MD), Diff MD
2003
2004
103
VIRTUAL PRIVATE NETWORK W
VIRTUAL PRIVATE NETWORK X
HE 1
HE 2
HE 10
HE 3
HE 4
HE 9
STU 1
STU 2
STU 3
STU 4
STU 9
2005
301
VIRTUAL PRIVATE NETWORK U & V
DOWNSTREAM CHANNEL 1
301
DOWNSTREAM CHANNEL 2
302
2006
HEAD END COMMUNICATION CONTROLLER
UPSTREAM CHANNEL 1
VIRTUAL PRIVATE NETWORK W
302
UPSTREAM CHANNEL 2
2007
DOWNSTREAM CHANNEL 3
VIRTUAL PRIVATE NETWORK X
UPSTREAM CHANNEL 3
2008
2009
106
STU 5
STU 6
STU 7
STU 8
108
HE 5
HE 6
HE 11
HE 7
HE 8
107
VIRTUAL PRIVATE NETWORK U
VIRTUAL PRIVATE NETWORK V
2001
2002
Diff Down, Same Up, Same MD
Different Down, Diff Up, Diff MD

Figure 20.

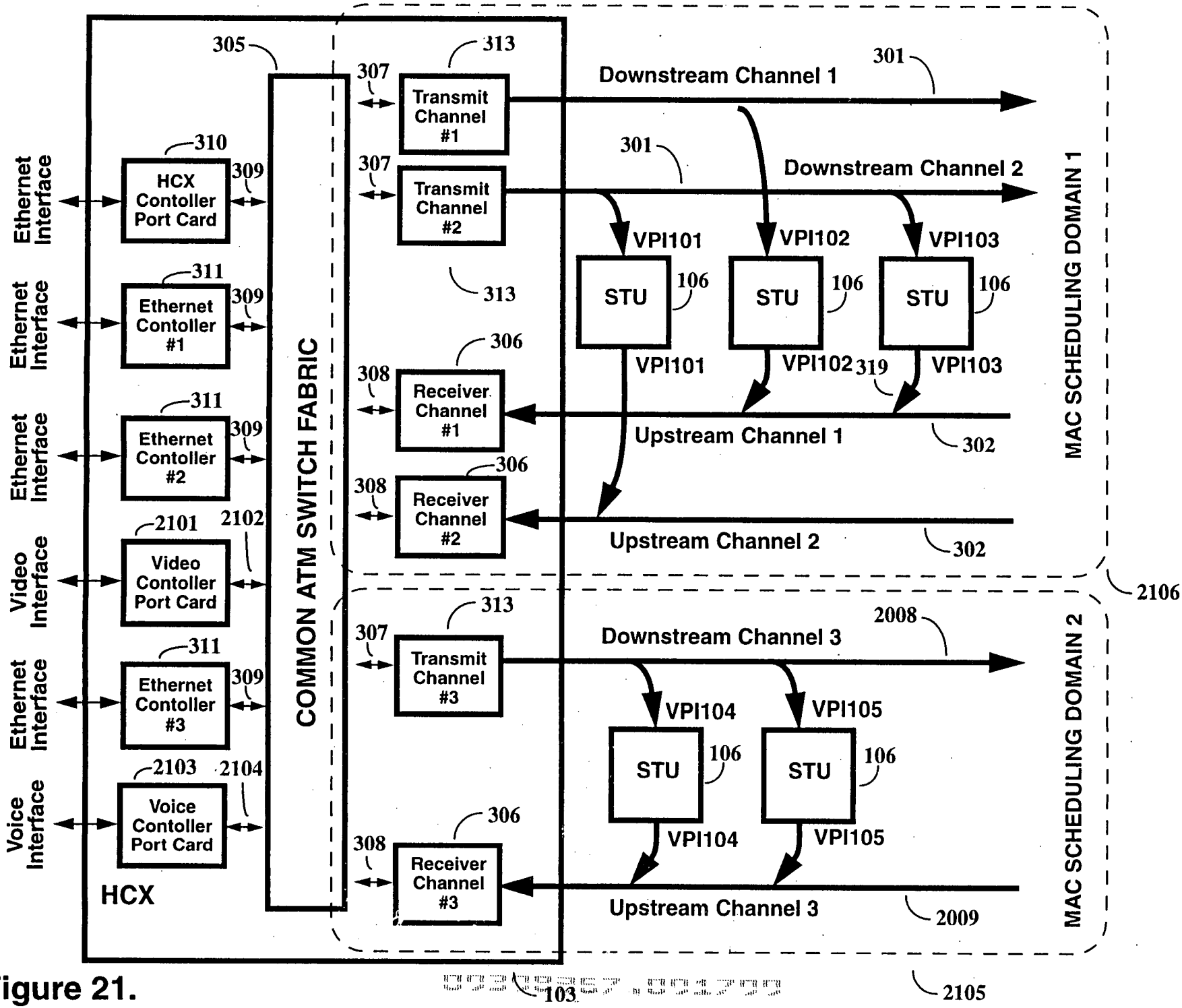
HCX
Ethernet Interface
Ethernet Interface
Ethernet Interface
Video Interface
Ethernet Interface
Voice Interface
HCX Contoller Port Card
Ethernet Contoller #1
Ethernet Contoller #2
Video Contoller Port Card
Ethernet Contoller #3
Voice Contoller Port Card
COMMON ATM SWITCH FABRIC
Transmit Channel #1
Transmit Channel #2
Transmit Channel #3
Receiver Channel #1
Receiver Channel #2
Receiver Channel #3
Downstream Channel 1
Downstream Channel 2
Downstream Channel 3
Upstream Channel 1
Upstream Channel 2
Upstream Channel 3
VPI101
VPI102
VPI103
VPI104
VPI105
STU
MAC SCHEDULING DOMAIN 1
MAC SCHEDULING DOMAIN 2
305
310
309
311
313
307
306
308
301
302
319
2101
2102
2103
2104
2008
2009
106
2106
2105
103

Figure 21.

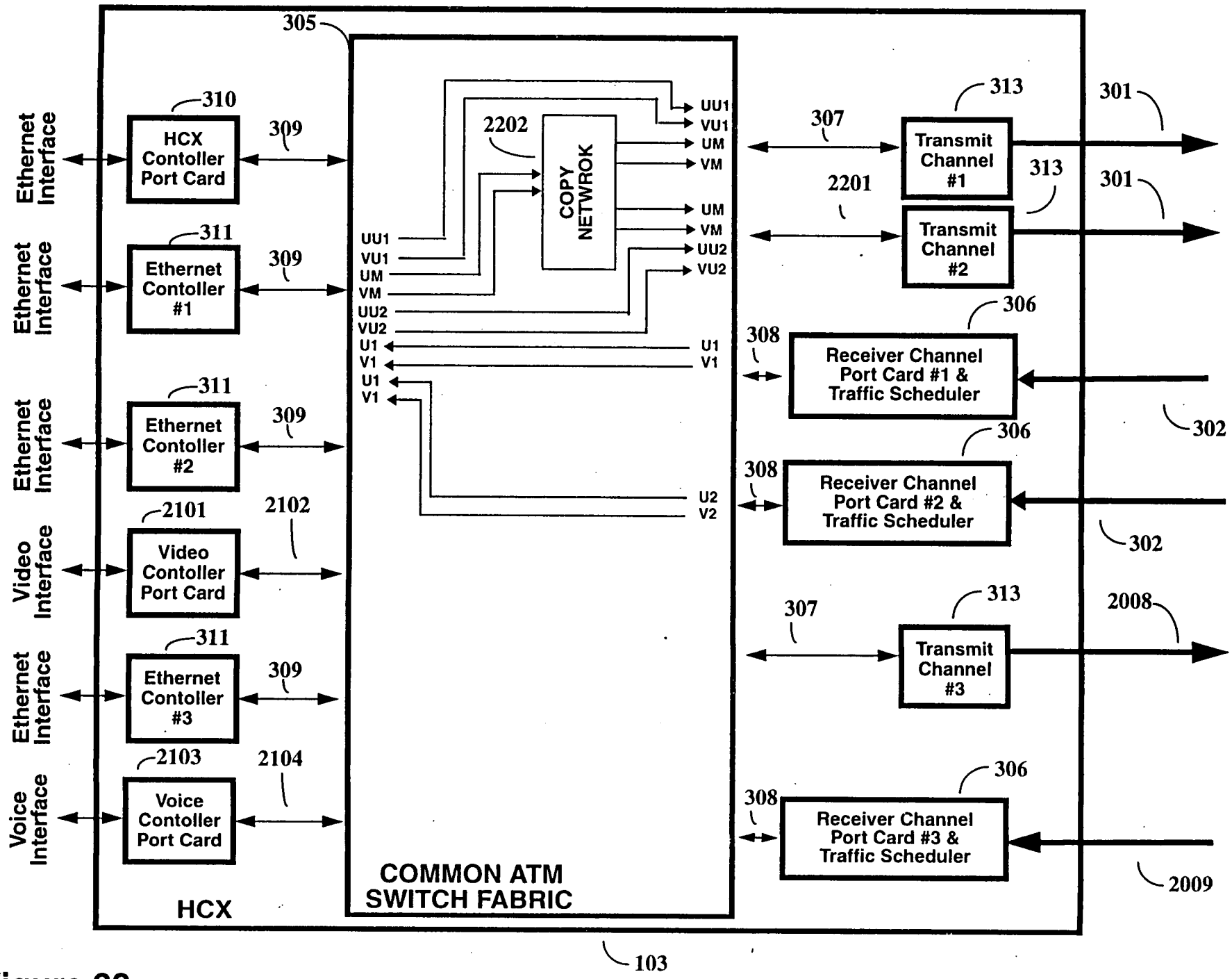
305
310
HCX Contoller Port Card
309
Ethernet Interface
311
Ethernet Contoller #1
Ethernet Contoller #2
Video Contoller Port Card
2101
2102
Video Interface
Ethernet Contoller #3
2103
2104
Voice Contoller Port Card
Voice Interface
HCX
2202
COPY NETWROK
UU1
VU1
UM
VM
UU2
VU2
U1
V1
U2
V2
COMMON ATM SWITCH FABRIC
313
307
Transmit Channel #1
2201
Transmit Channel #2
301
306
308
Receiver Channel Port Card #1 & Traffic Scheduler
302
Receiver Channel Port Card #2 & Traffic Scheduler
Transmit Channel #3
2008
Receiver Channel Port Card #3 & Traffic Scheduler
2009
103

Figure 22.

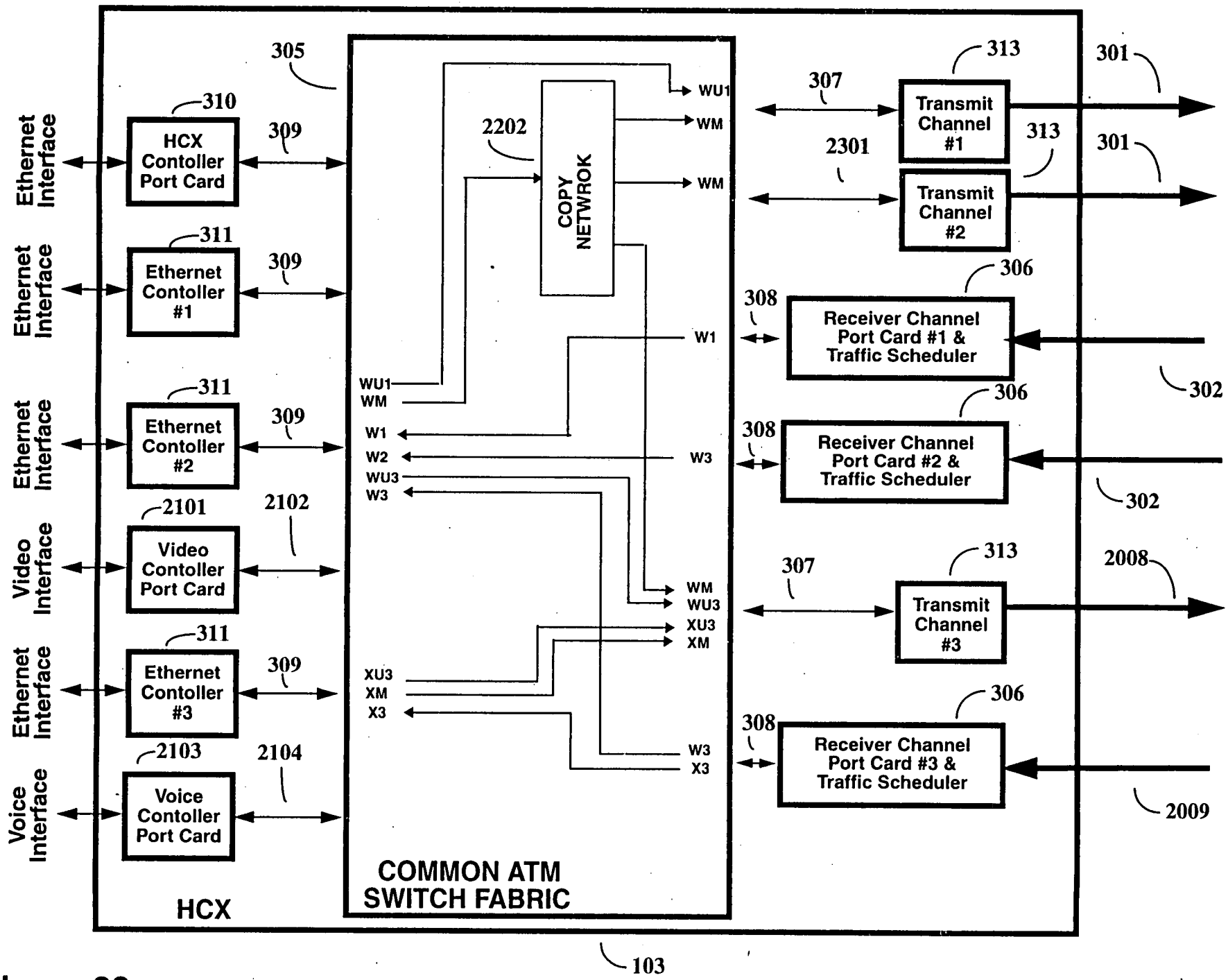
Ethernet Interface
Ethernet Interface
Ethernet Interface
Video Interface
Ethernet Interface
Voice Interface
HCX Contoller Port Card
Ethernet Contoller #1
Ethernet Contoller #2
Video Contoller Port Card
Ethernet Contoller #3
Voice Contoller Port Card
HCX
305
310
309
311
2101
2102
2103
2104
COPY NETWROK
2202
WU1
WM
W1
W2
W3
WU3
XU3
XM
X3
COMMON ATM SWITCH FABRIC
307
313
2301
Transmit Channel #1
Transmit Channel #2
Transmit Channel #3
301
306
308
Receiver Channel Port Card #1 & Traffic Scheduler
Receiver Channel Port Card #2 & Traffic Scheduler
Receiver Channel Port Card #3 & Traffic Scheduler
302
2008
2009
103

Figure 23.

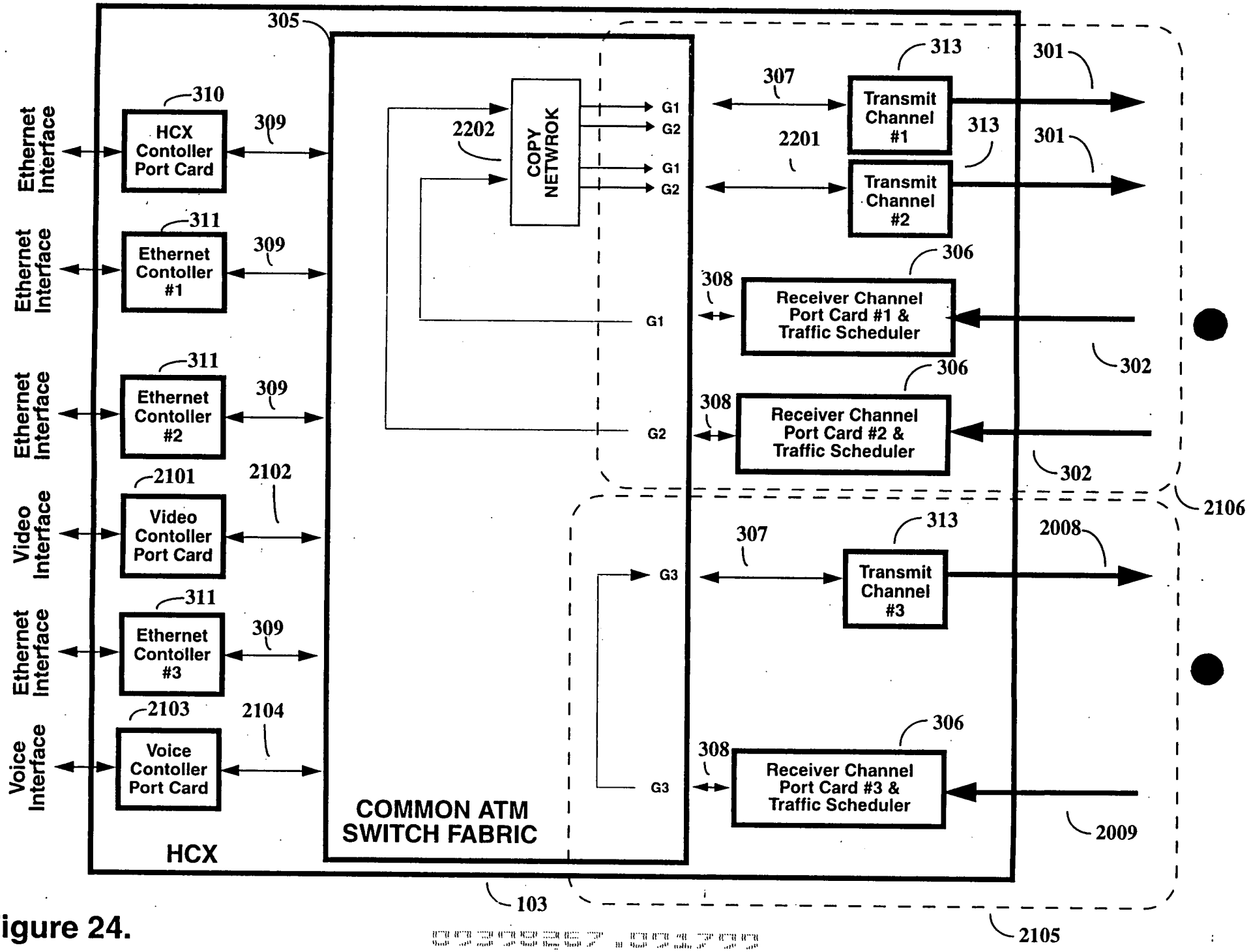
305
HCX
Ethernet Interface
Ethernet Interface
Ethernet Interface
Video Interface
Ethernet Interface
Voice Interface
310
HCX Contoller Port Card
311
Ethernet Contoller #1
311
Ethernet Contoller #2
2101
Video Contoller Port Card
311
Ethernet Contoller #3
2103
Voice Contoller Port Card
309
309
309
2102
309
2104
COMMON ATM SWITCH FABRIC
2202
COPY NETWROK
G1
G2
G1
G2
G1
G2
G3
G3
307
2201
313
Transmit Channel #1
313
Transmit Channel #2
307
313
Transmit Channel #3
301
301
306
308
Receiver Channel Port Card #1 & Traffic Scheduler
302
306
308
Receiver Channel Port Card #2 & Traffic Scheduler
302
306
308
Receiver Channel Port Card #3 & Traffic Scheduler
2009
2008
2106
103
2105

Figure 24.

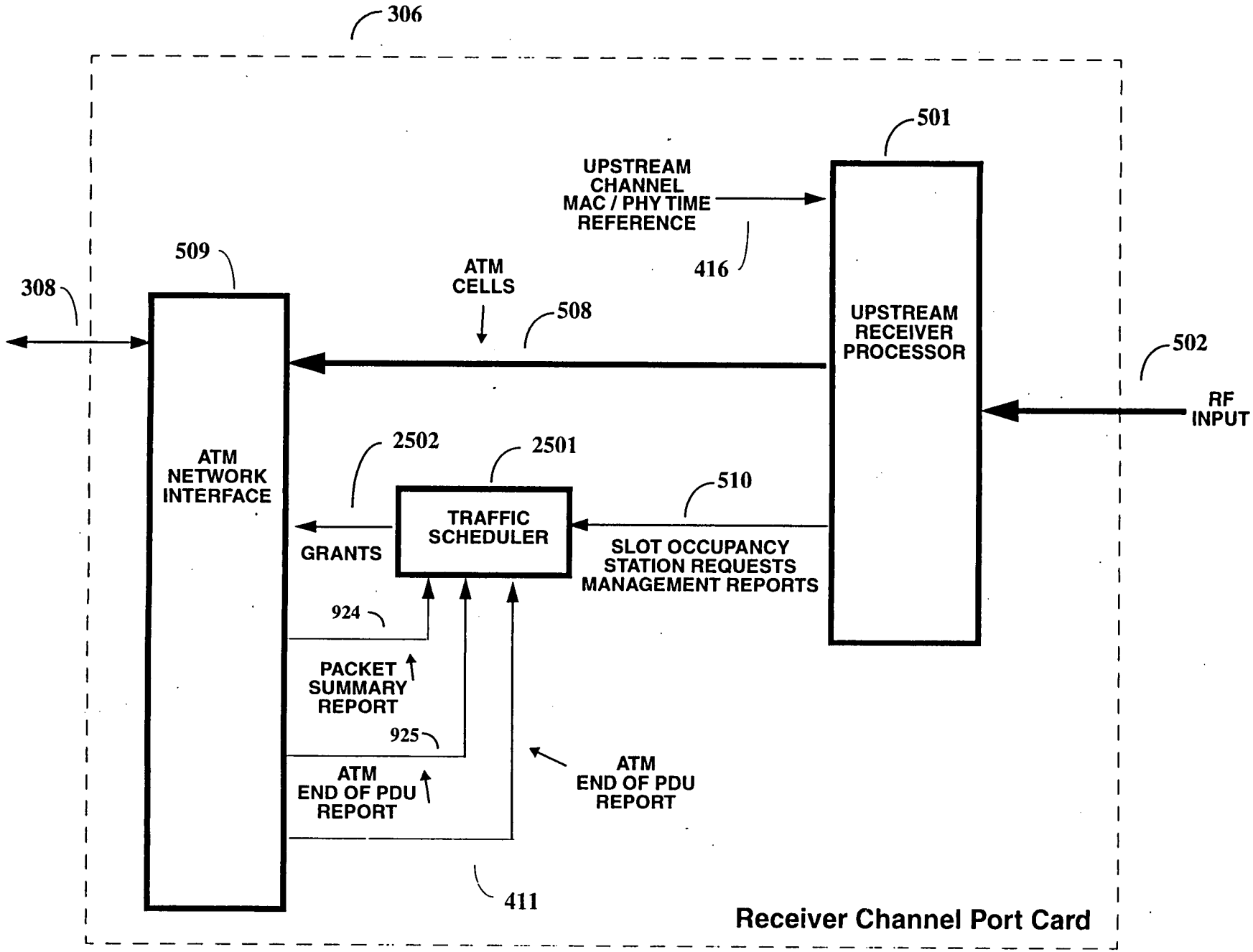
306
501
UPSTREAM CHANNEL MAC / PHY TIME REFERENCE
416
509
308
ATM CELLS
508
UPSTREAM RECEIVER PROCESSOR
502
RF INPUT
ATM NETWORK INTERFACE
2502
2501
510
TRAFFIC SCHEDULER
GRANTS
SLOT OCCUPANCY
STATION REQUESTS
MANAGEMENT REPORTS
924
PACKET SUMMARY REPORT
925
ATM END OF PDU REPORT
ATM END OF PDU REPORT
411
Receiver Channel Port Card

Figure 25.

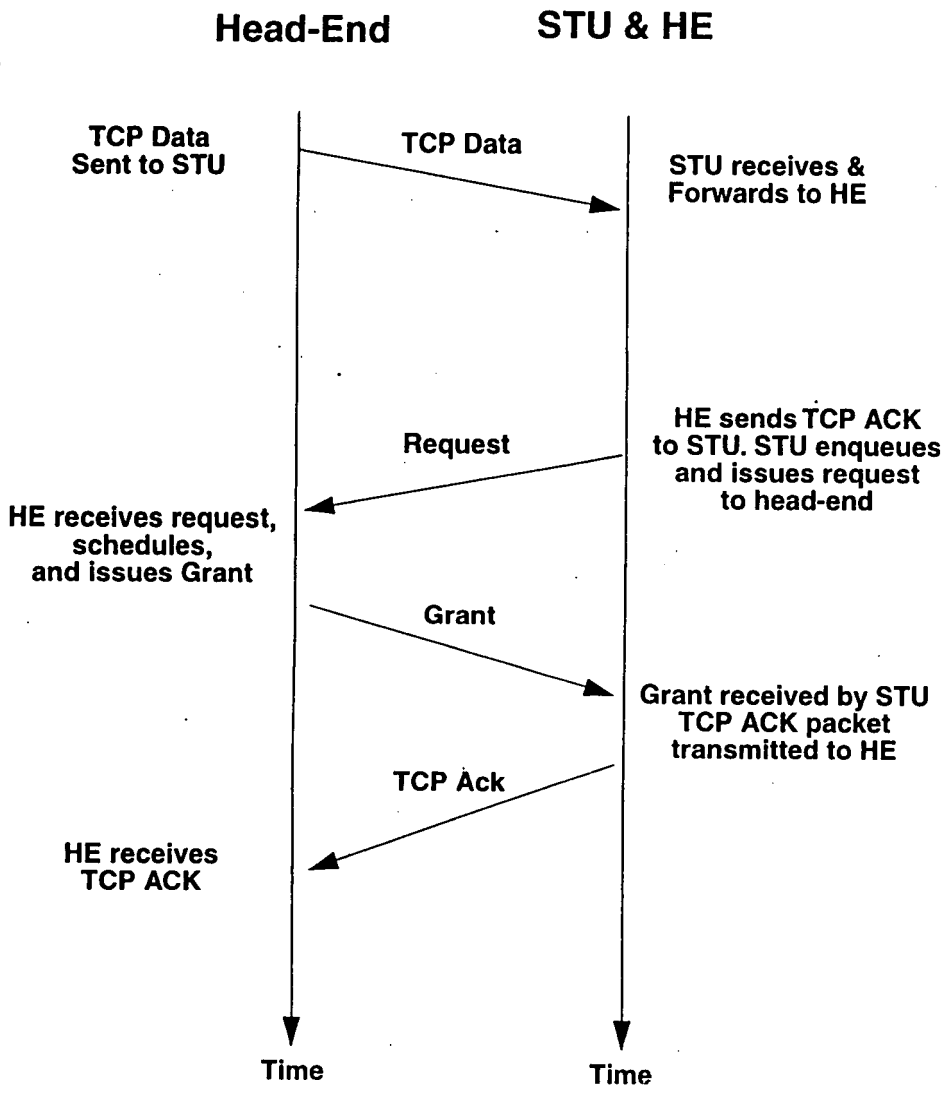

Figure 26a.

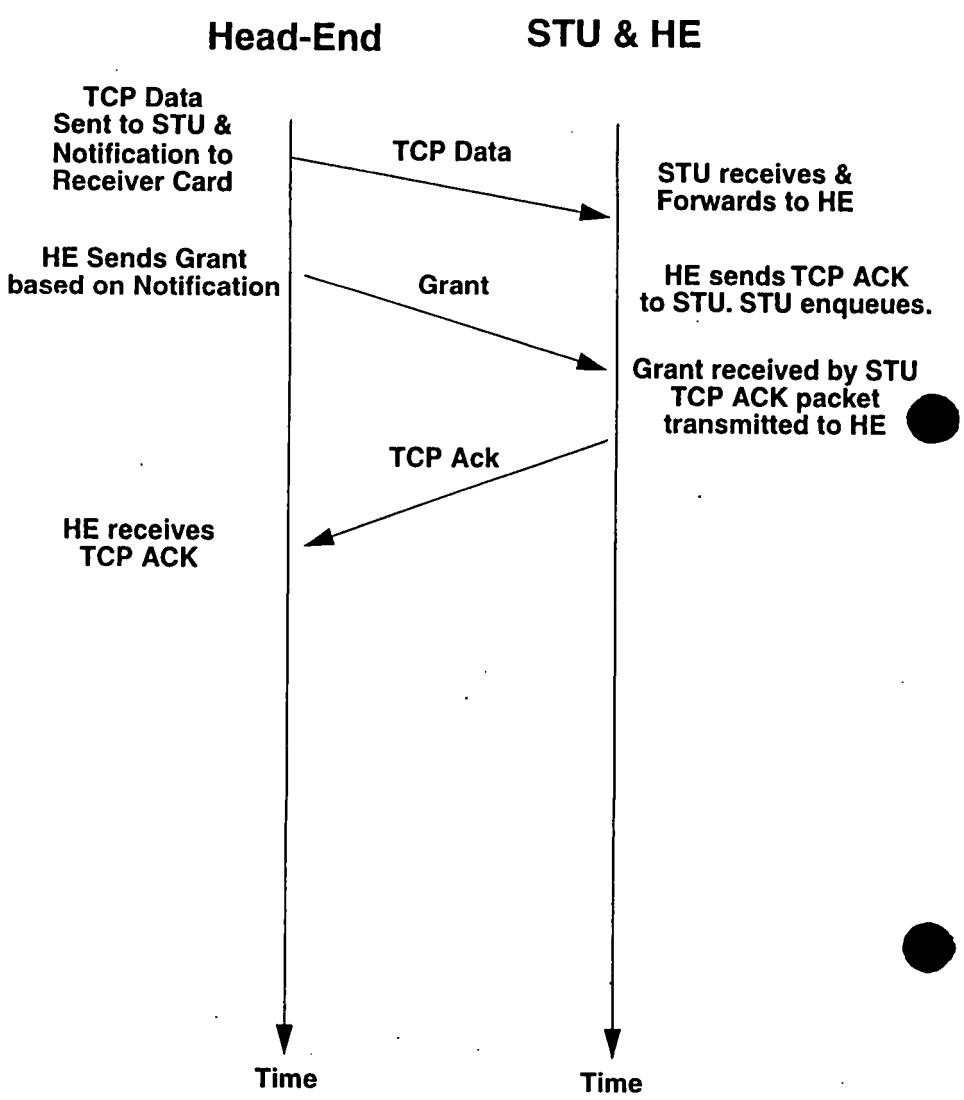

Figure 26b.

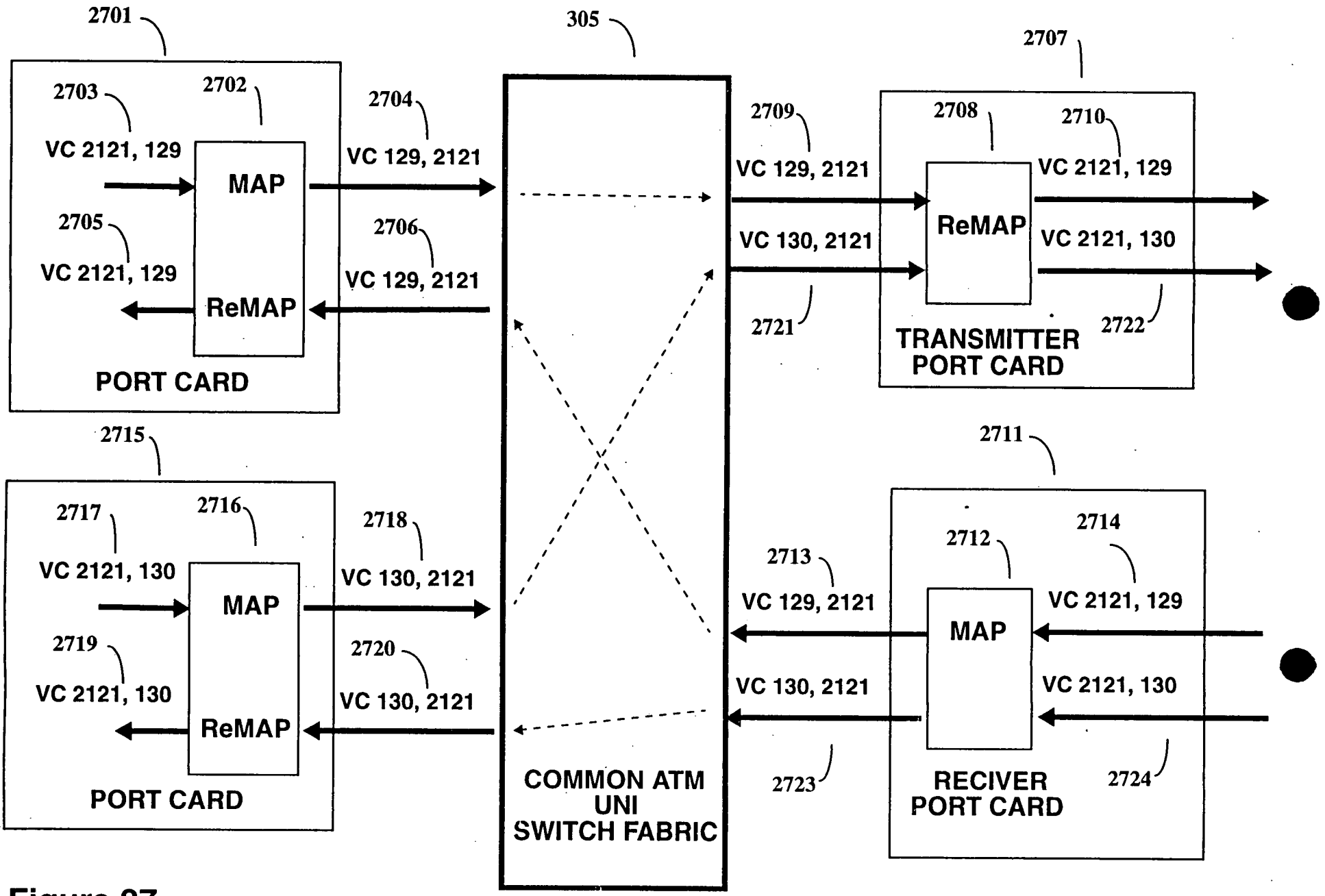
2701
305
2707
2703
2702
2704
2709
2708
2710
VC 2121, 129
MAP
VC 129, 2121
VC 129, 2121
VC 2121, 129
2705
2706
VC 130, 2121
ReMAP
VC 2121, 130
VC 2121, 129
ReMAP
VC 129, 2121
2721
2722
PORT CARD
TRANSMITTER
PORT CARD
2715
2711
2717
2716
2718
2714
2712
2713
VC 2121, 130
MAP
VC 130, 2121
VC 129, 2121
VC 2121, 129
MAP
2719
2720
VC 130, 2121
VC 130, 2121
VC 2121, 130
VC 2121, 130
ReMAP
VC 130, 2121
2723
2724
COMMON ATM
UNI
SWITCH FABRIC
PORT CARD
RECIVER
PORT CARD

Figure 27.

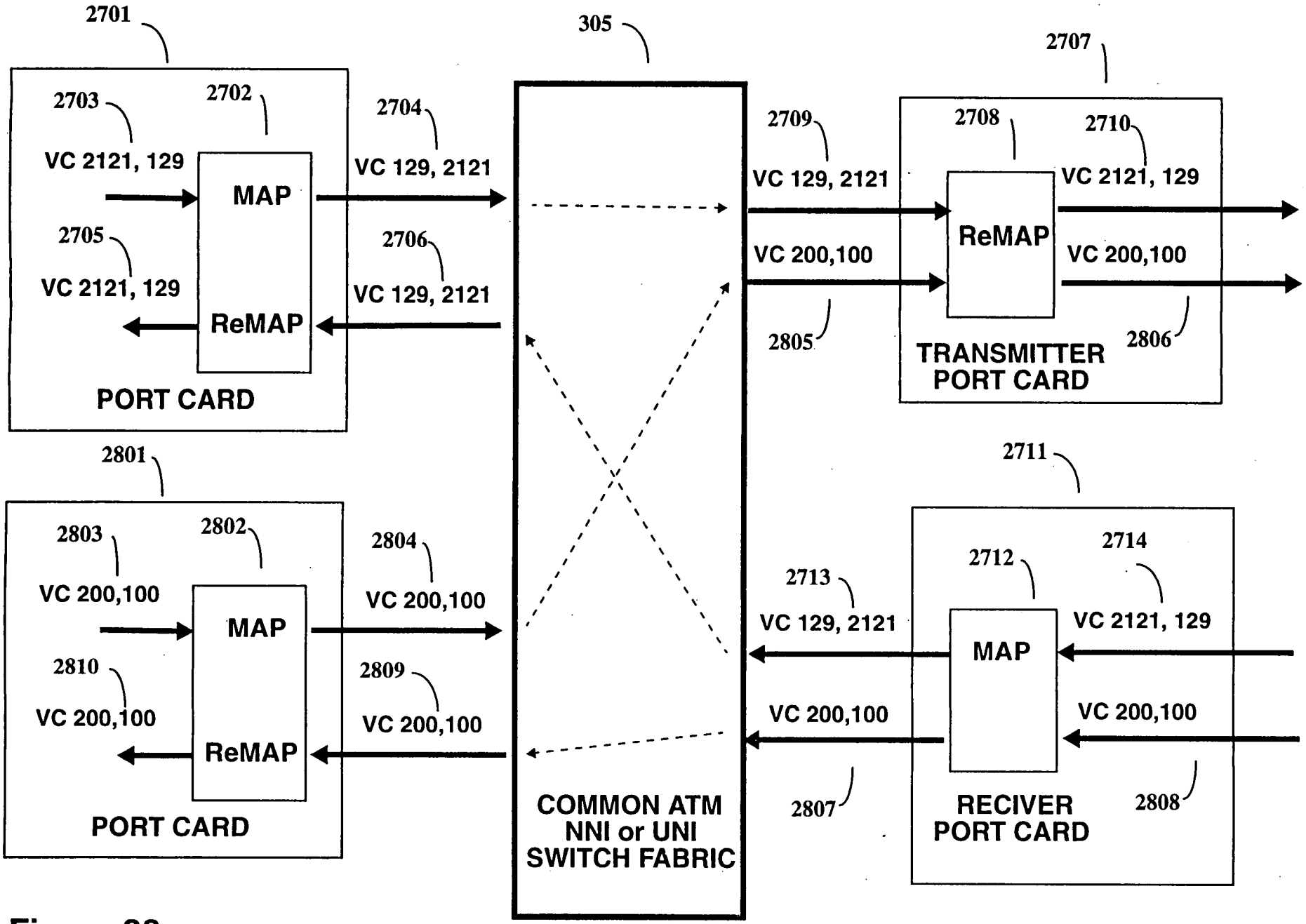
2701
305
2707
2703
2702
2704
2709
2708
2710
VC 2121, 129
MAP
VC 129, 2121
VC 129, 2121
ReMAP
VC 2121, 129
2705
2706
VC 200,100
VC 200,100
VC 129, 2121
2805
2806
TRANSMITTER
PORT CARD
PORT CARD
2801
2711
2803
2802
2804
2712
2714
VC 200,100
MAP
VC 200,100
2713
VC 129, 2121
VC 2121, 129
2810
2809
VC 200,100
VC 200,100
VC 200,100
VC 200,100
ReMAP
2807
2808
COMMON ATM
NNI or UNI
SWITCH FABRIC
RECIVER
PORT CARD
PORT CARD

Figure 28.

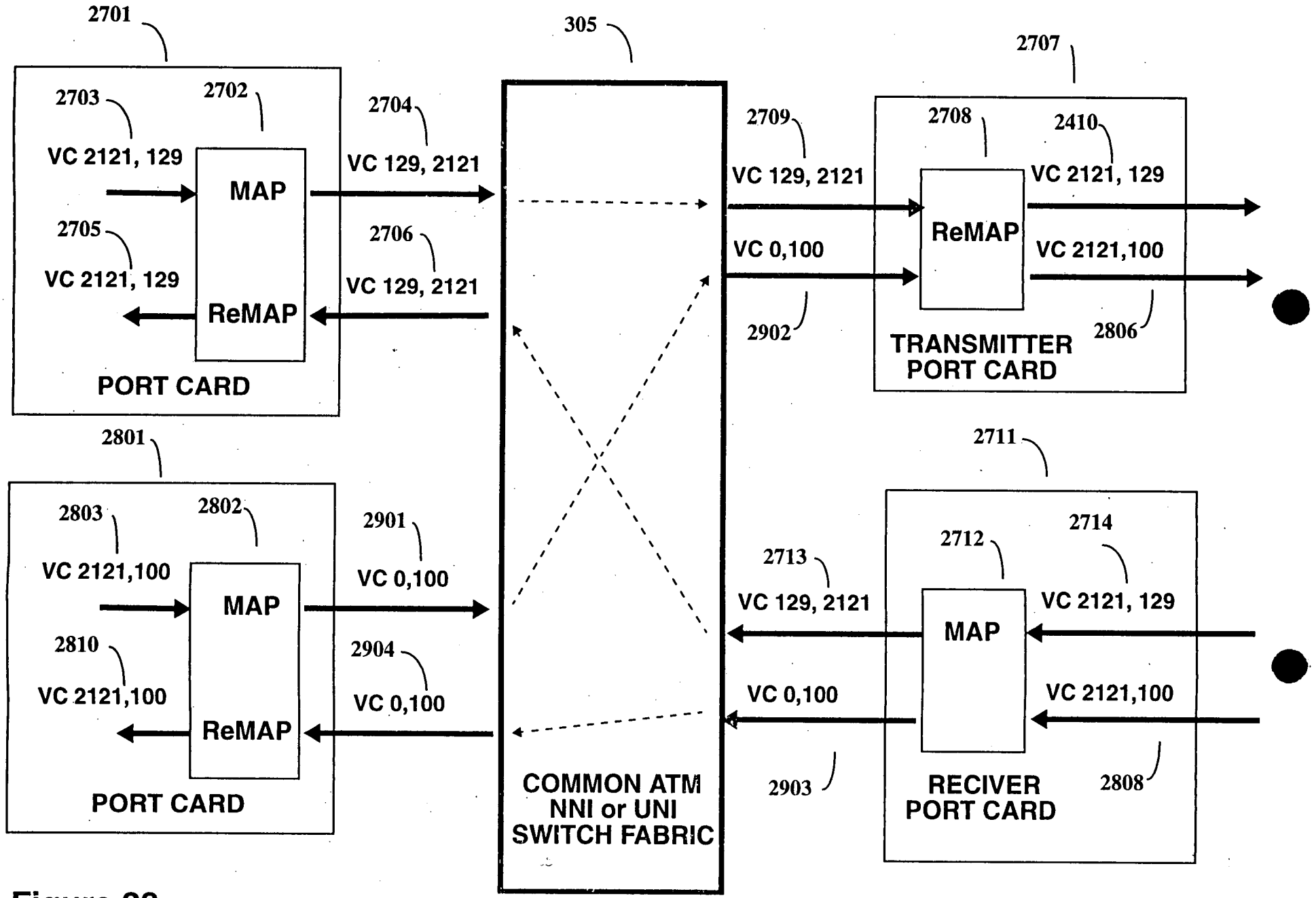
2701
305
2707
2703
2702
2704
2709
2708
2410
VC 2121, 129
MAP
VC 129, 2121
VC 129, 2121
VC 2121, 129
2705
2706
VC 0,100
ReMAP
VC 2121,100
VC 2121, 129
ReMAP
2902
2806
PORT CARD
TRANSMITTER
PORT CARD
2801
2711
2803
2802
2901
2712
2714
VC 2121,100
VC 0,100
2713
MAP
VC 129, 2121
VC 2121, 129
2810
2904
VC 0,100
VC 2121,100
VC 0,100
VC 2121,100
ReMAP
2903
2808
PORT CARD
COMMON ATM
NNI or UNI
SWITCH FABRIC
RECIVER
PORT CARD

Figure 29.

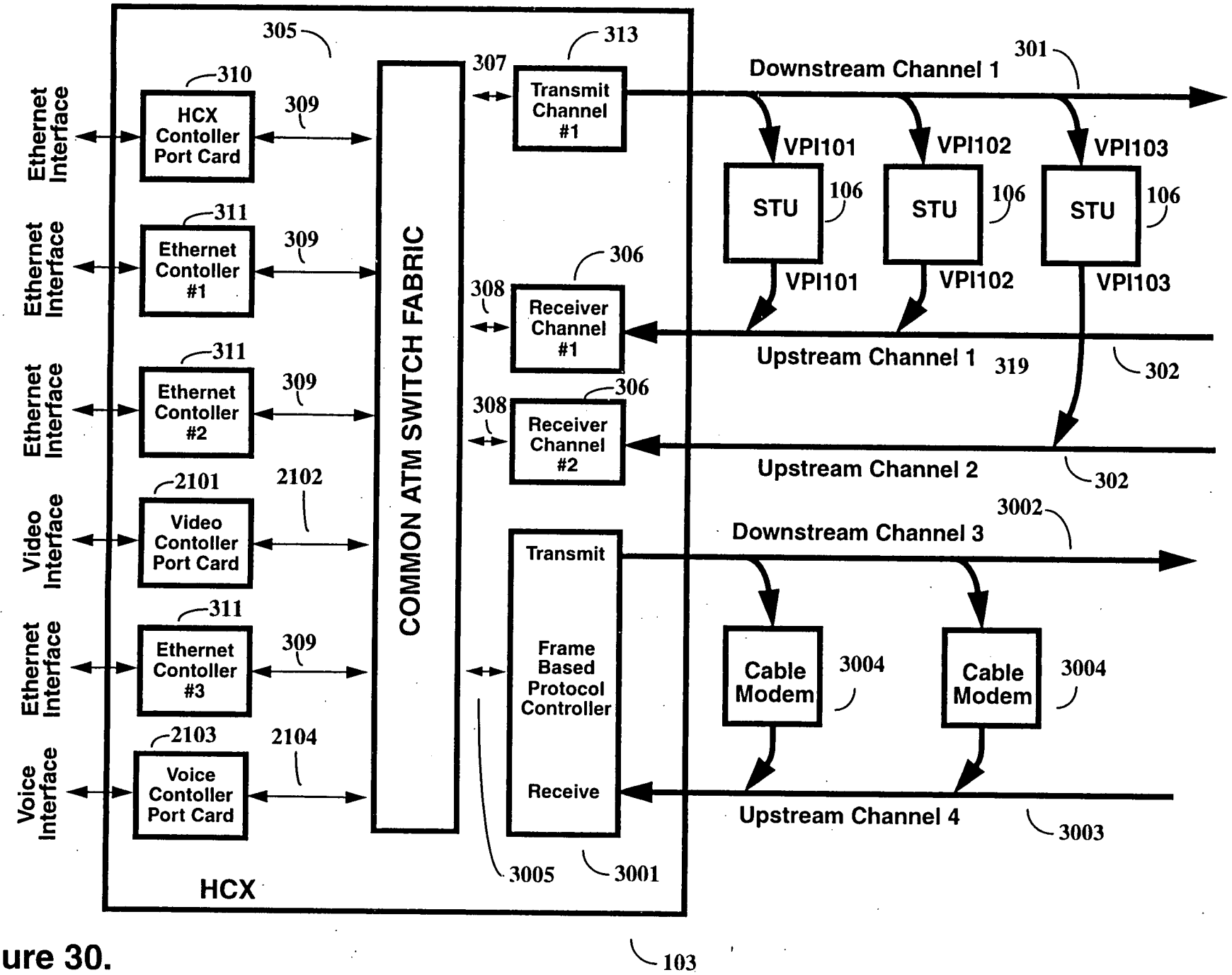
305
313
307
310
309
301
Downstream Channel 1
HCX Contoller Port Card
Transmit Channel #1
Ethernet Interface
VPI101
VPI102
VPI103
STU
106
311
Ethernet Contoller #1
306
308
Receiver Channel #1
Upstream Channel 1
319
302
Ethernet Contoller #2
Receiver Channel #2
Upstream Channel 2
2101
2102
3002
Downstream Channel 3
Video Contoller Port Card
Video Interface
Transmit
Ethernet Contoller #3
Frame Based Protocol Controller
Cable Modem
3004
2103
2104
Voice Contoller Port Card
Voice Interface
Receive
Upstream Channel 4
3003
COMMON ATM SWITCH FABRIC
3005
3001
HCX
103

Figure 30.

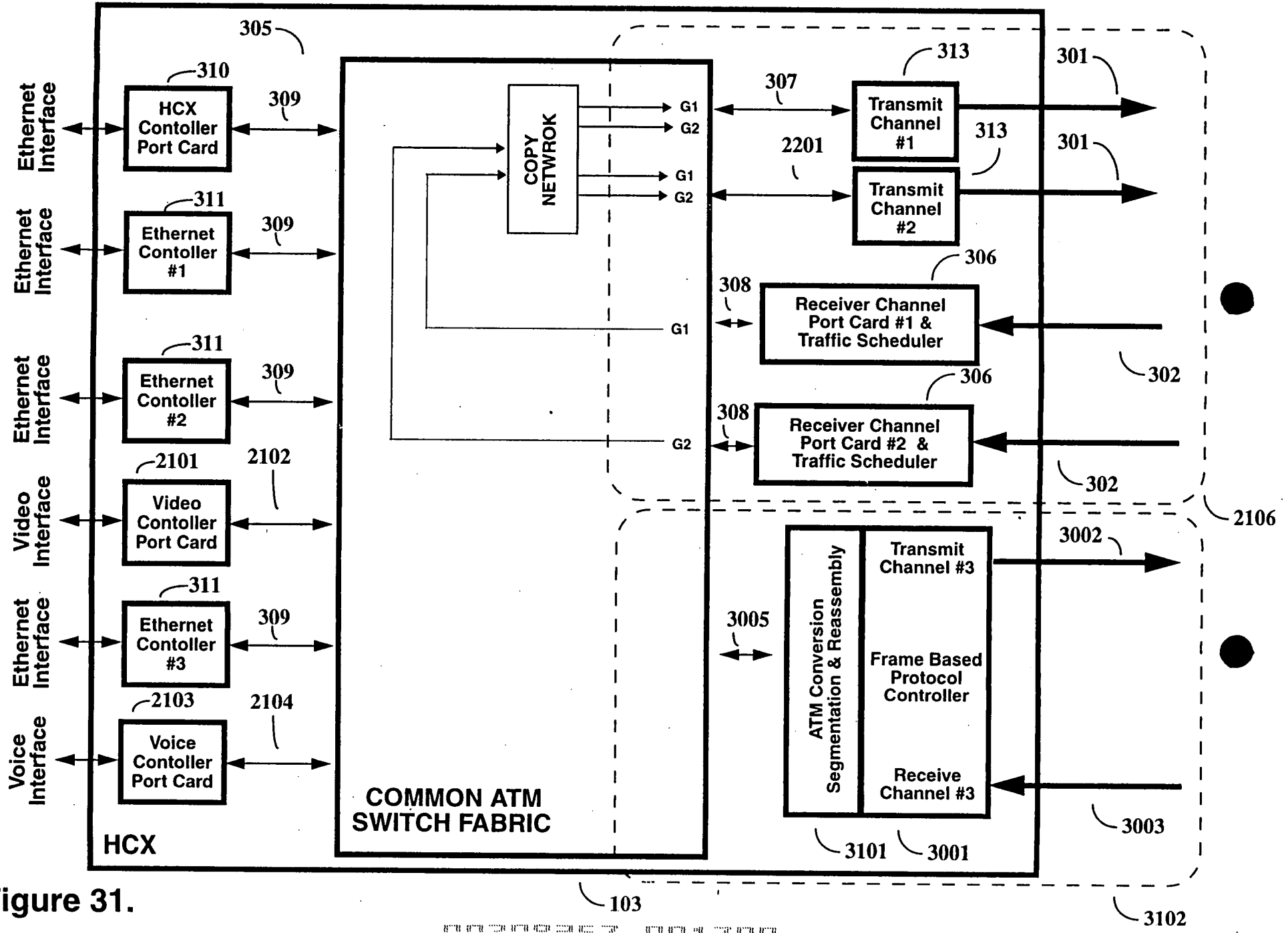
305
310
HCX Contoller Port Card
309
Ethernet Interface
311
Ethernet Contoller #1
Ethernet Contoller #2
Video Contoller Port Card
2101
2102
Video Interface
Ethernet Contoller #3
Voice Contoller Port Card
2103
2104
Voice Interface
COPY NETWROK
G1
G2
307
313
Transmit Channel #1
2201
Transmit Channel #2
301
306
308
Receiver Channel Port Card #1 & Traffic Scheduler
302
Receiver Channel Port Card #2 & Traffic Scheduler
2106
3002
3005
ATM Conversion Segmentation & Reassembly
Transmit Channel #3
Frame Based Protocol Controller
Receive Channel #3
3003
3101
3001
COMMON ATM SWITCH FABRIC
HCX
103
3102

Figure 31.

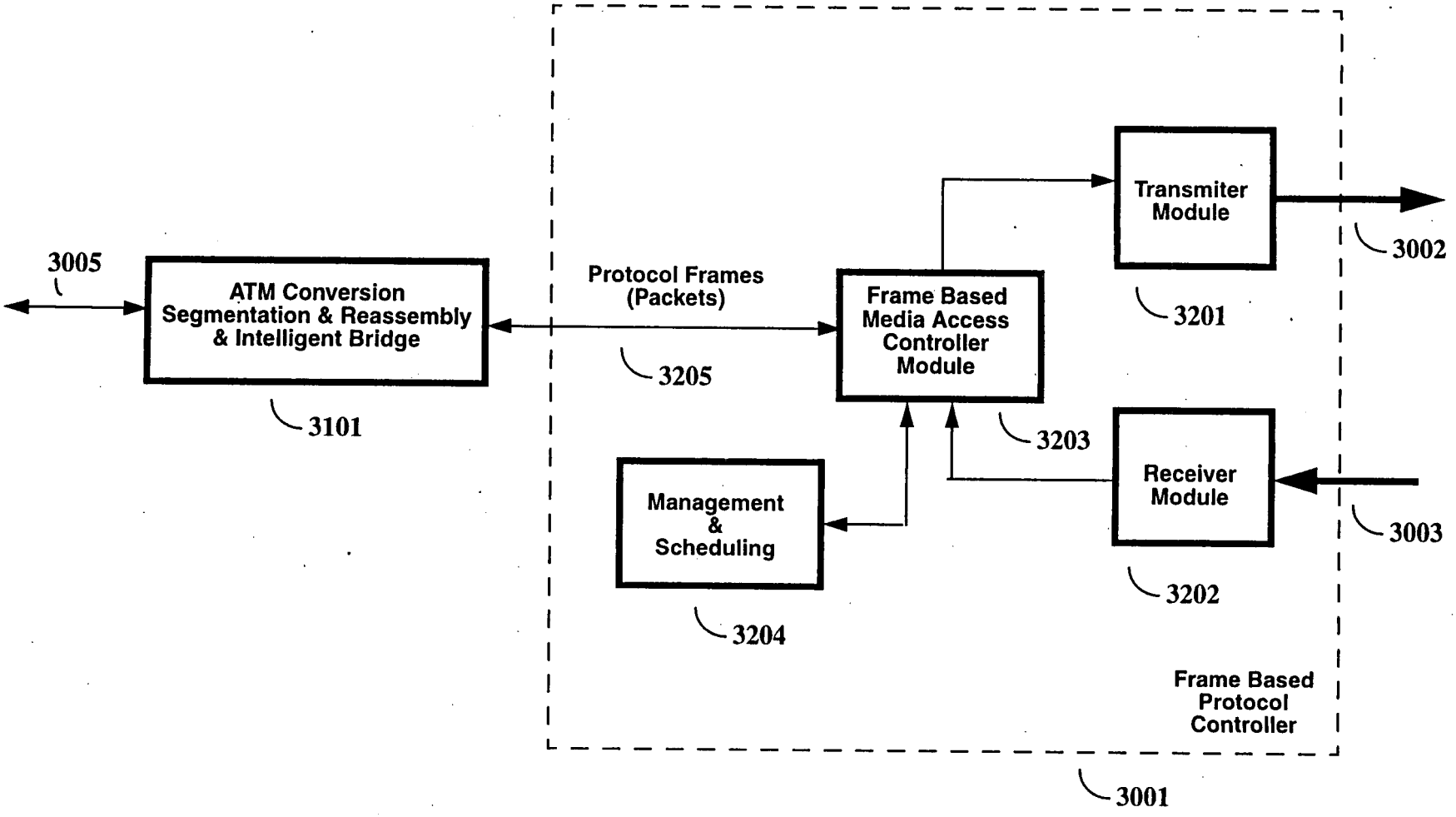
3005
ATM Conversion
Segmentation & Reassembly
& Intelligent Bridge
3101
Protocol Frames
(Packets)
3205
Frame Based
Media Access
Controller
Module
3203
Transmiter
Module
3201
3002
Receiver
Module
3202
3003
Management
&
Scheduling
3204
Frame Based
Protocol
Controller
3001

Figure 32.

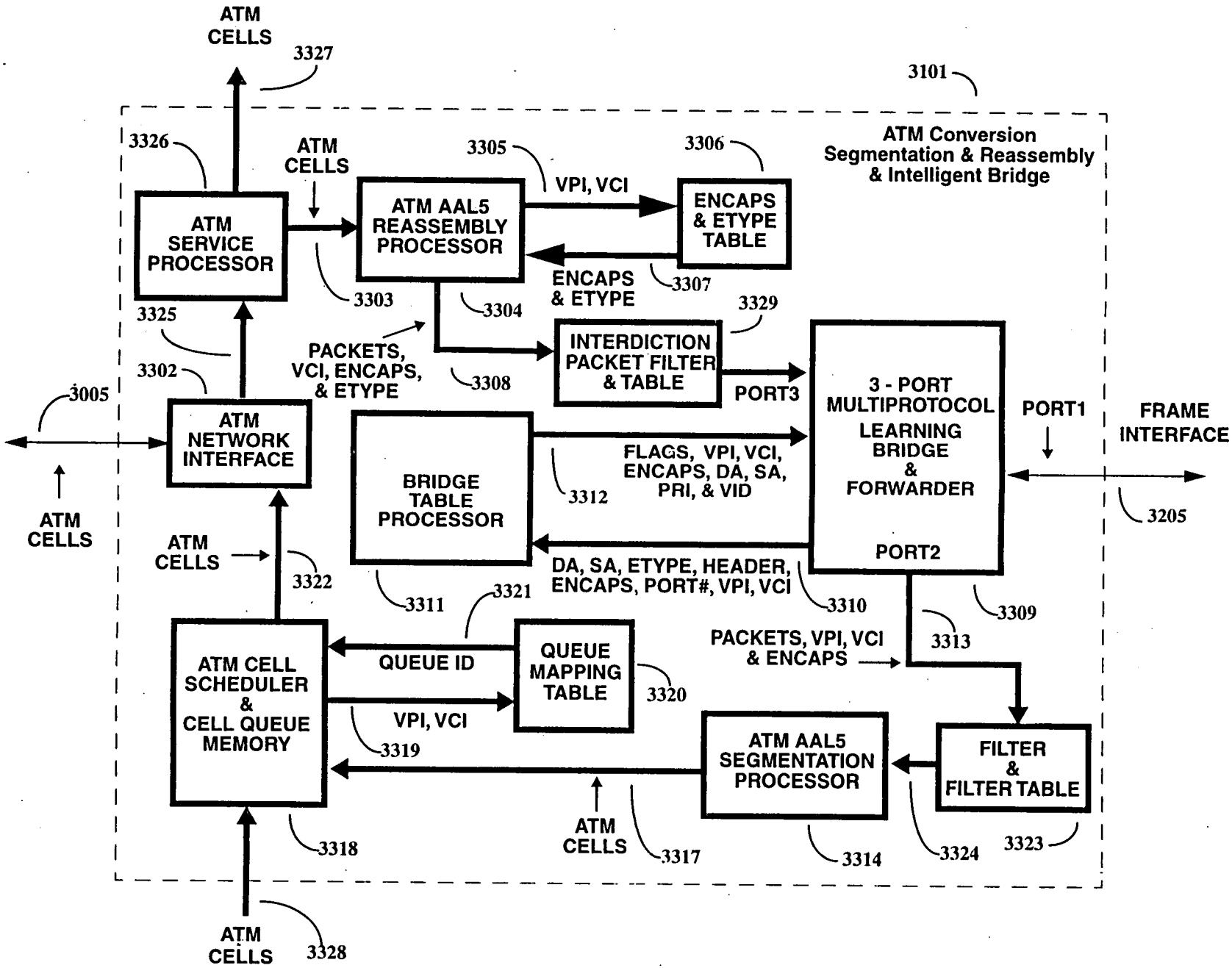
ATM CELLS
3327
3101
ATM Conversion Segmentation & Reassembly & Intelligent Bridge
3326
ATM CELLS
3305
VPI, VCI
3306
ATM SERVICE PROCESSOR
ATM AAL5 REASSEMBLY PROCESSOR
ENCAPS & ETYPE TABLE
ENCAPS & ETYPE
3307
3303
3304
3325
3329
PACKETS, VCI, ENCAPS, & ETYPE
INTERDICTION PACKET FILTER & TABLE
3302
3308
PORT3
3005
ATM NETWORK INTERFACE
3 - PORT MULTIPROTOCOL LEARNING BRIDGE & FORWARDER
PORT1
FRAME INTERFACE
BRIDGE TABLE PROCESSOR
FLAGS, VPI, VCI, ENCAPS, DA, SA, PRI, & VID
3312
ATM CELLS
ATM CELLS
3322
PORT2
3205
DA, SA, ETYPE, HEADER, ENCAPS, PORT#, VPI, VCI
3311
3321
3310
3309
3313
PACKETS, VPI, VCI & ENCAPS
ATM CELL SCHEDULER & CELL QUEUE MEMORY
QUEUE ID
QUEUE MAPPING TABLE
3320
VPI, VCI
3319
ATM AAL5 SEGMENTATION PROCESSOR
FILTER & FILTER TABLE
ATM CELLS
3318
3317
3314
3324
3323
ATM CELLS
3328

Figure 33.

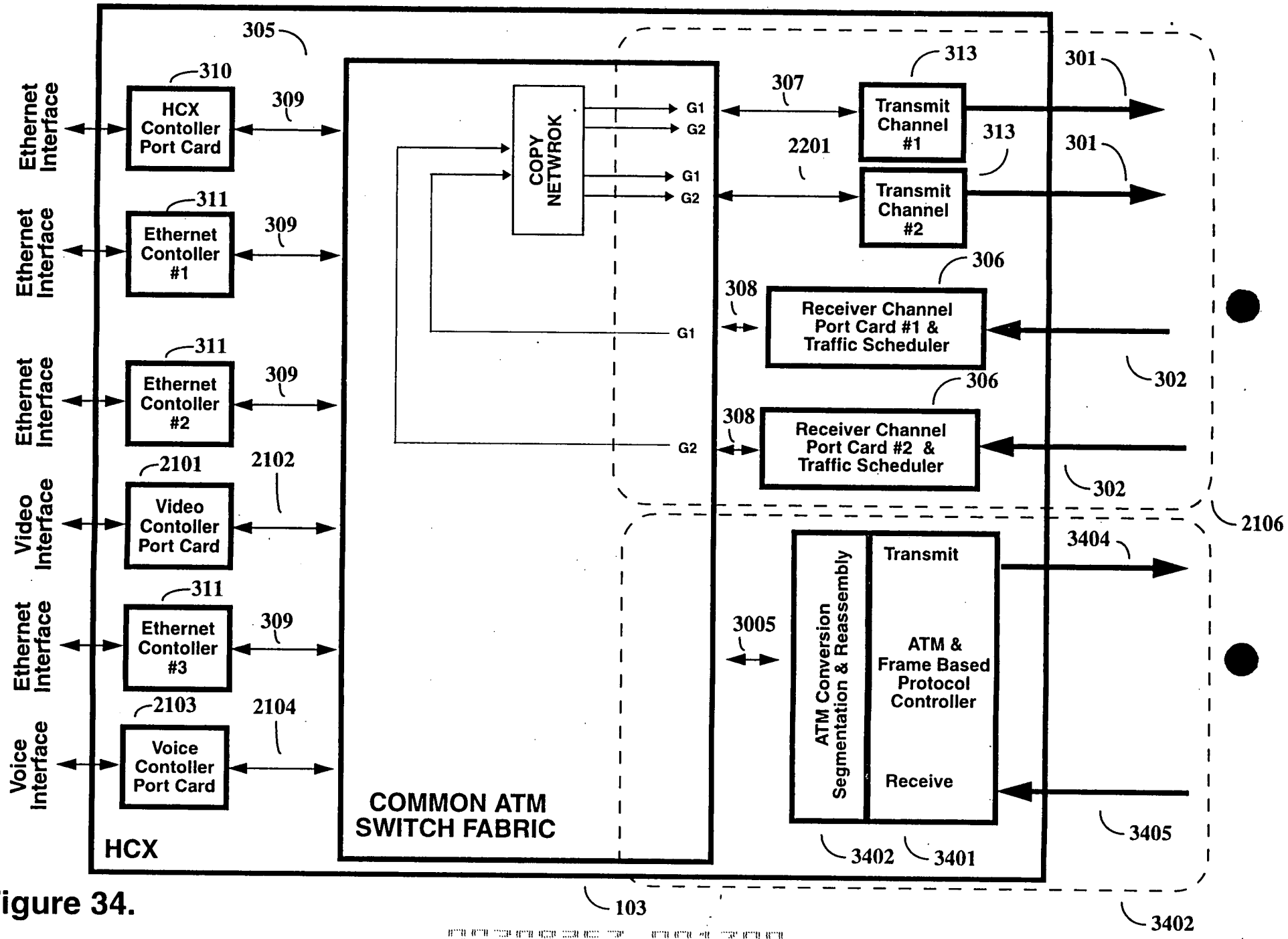
HCX
305
Ethernet Interface
Ethernet Interface
Ethernet Interface
Video Interface
Ethernet Interface
Voice Interface
310
HCX Contoller Port Card
311
Ethernet Contoller #1
311
Ethernet Contoller #2
2101
Video Contoller Port Card
311
Ethernet Contoller #3
2103
Voice Contoller Port Card
309
309
309
2102
309
2104
COMMON ATM SWITCH FABRIC
COPY NETWROK
G1
G2
G1
G2
G1
G2
307
2201
313
Transmit Channel #1
313
Transmit Channel #2
301
301
306
308
Receiver Channel Port Card #1 & Traffic Scheduler
302
306
308
Receiver Channel Port Card #2 & Traffic Scheduler
302
2106
3404
3005
ATM Conversion Segmentation & Reassembly
Transmit
ATM & Frame Based Protocol Controller
Receive
3405
3402
3401
103
3402

Figure 34.

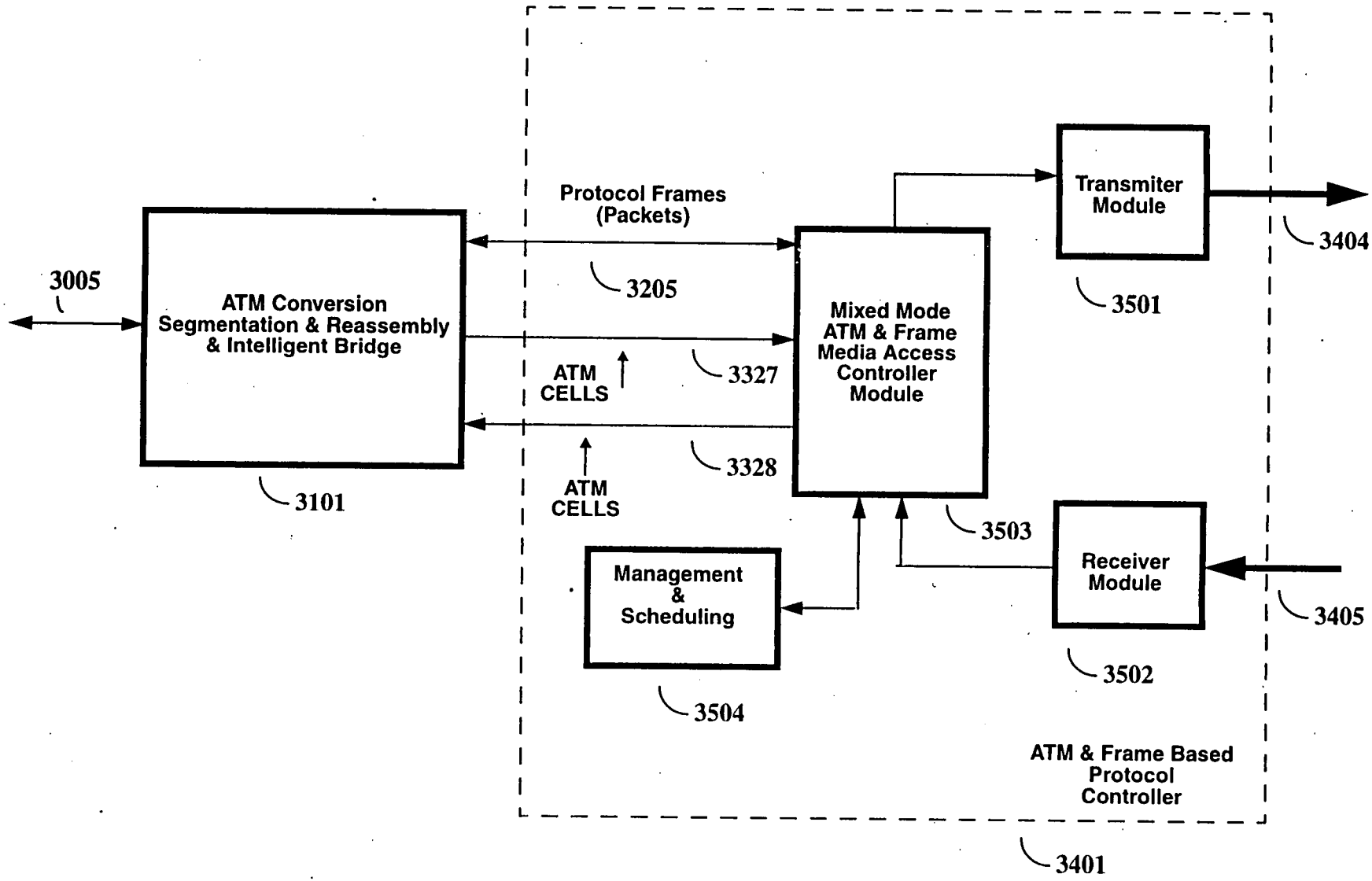
3005
ATM Conversion
Segmentation & Reassembly
& Intelligent Bridge
3101
Protocol Frames
(Packets)
3205
3327
ATM
CELLS
3328
ATM
CELLS
Mixed Mode
ATM & Frame
Media Access
Controller
Module
3503
Transmiter
Module
3501
3404
Receiver
Module
3502
3405
Management
&
Scheduling
3504
ATM & Frame Based
Protocol
Controller
3401

Figure 35.

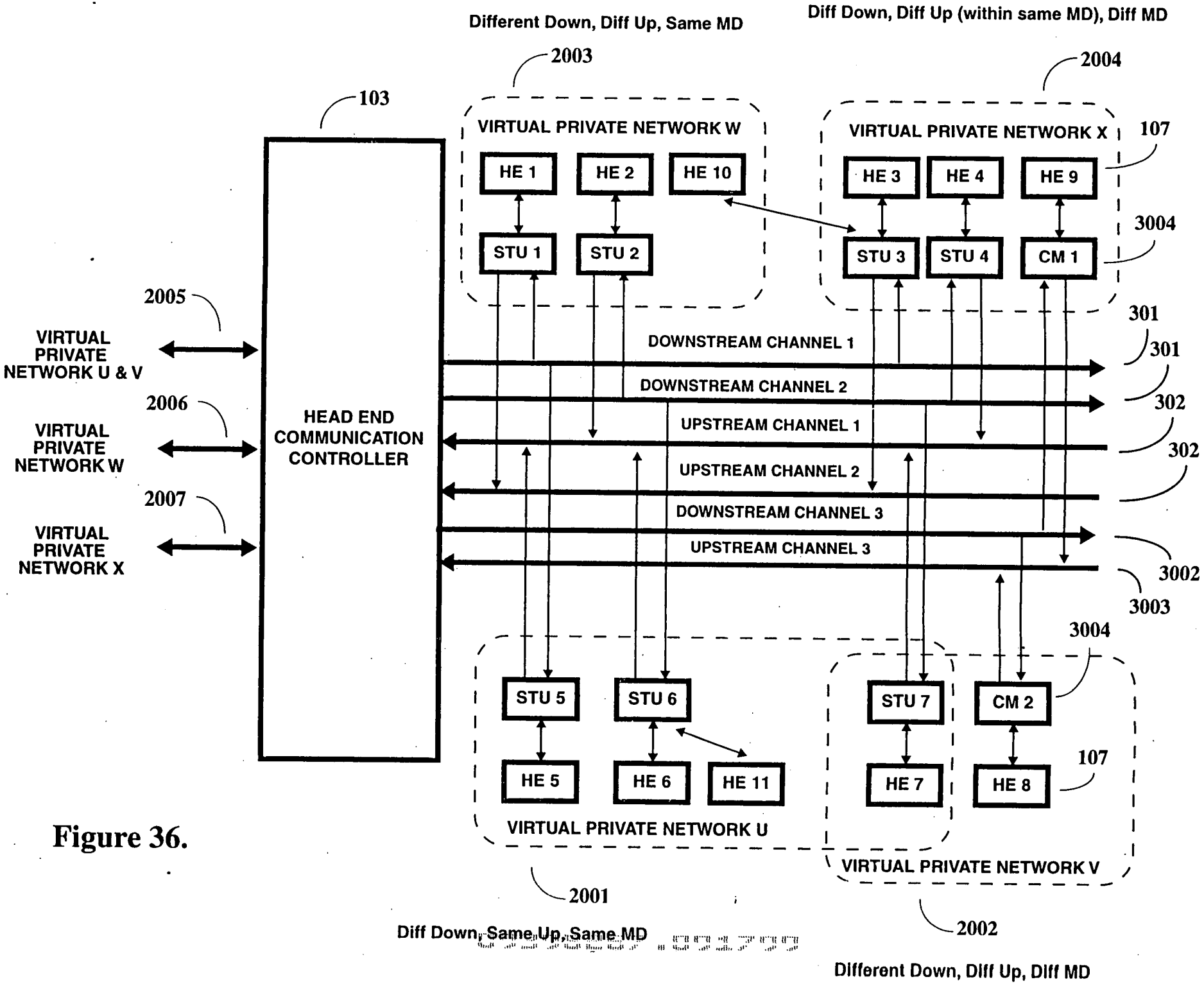
Different Down, Diff Up, Same MD
Diff Down, Diff Up (within same MD), Diff MD
2003
2004
103
VIRTUAL PRIVATE NETWORK W
VIRTUAL PRIVATE NETWORK X
107
HE 1
HE 2
HE 10
HE 3
HE 4
HE 9
3004
STU 1
STU 2
STU 3
STU 4
CM 1
2005
301
VIRTUAL PRIVATE NETWORK U & V
DOWNSTREAM CHANNEL 1
301
DOWNSTREAM CHANNEL 2
2006
302
HEAD END COMMUNICATION CONTROLLER
UPSTREAM CHANNEL 1
VIRTUAL PRIVATE NETWORK W
302
UPSTREAM CHANNEL 2
2007
DOWNSTREAM CHANNEL 3
VIRTUAL PRIVATE NETWORK X
UPSTREAM CHANNEL 3
3002
3003
3004
STU 5
STU 6
STU 7
CM 2
107
HE 5
HE 6
HE 11
HE 7
HE 8
VIRTUAL PRIVATE NETWORK U
VIRTUAL PRIVATE NETWORK V
2001
2002
Diff Down, Same Up, Same MD
Different Down, Diff Up, Diff MD

Figure 36.

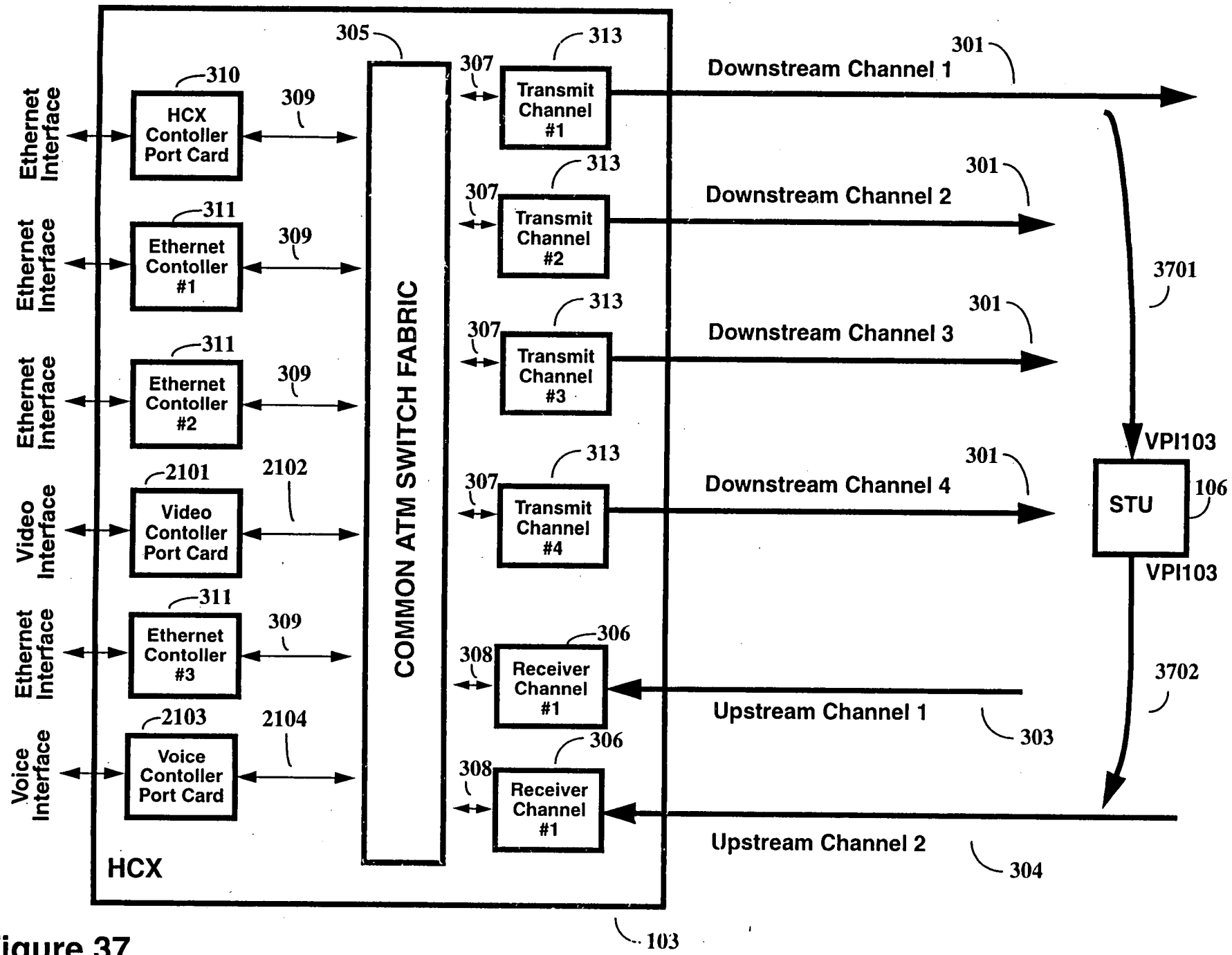
HCX
Ethernet Interface
Ethernet Interface
Ethernet Interface
Video Interface
Ethernet Interface
Voice Interface
HCX Contoller Port Card
Ethernet Contoller #1
Ethernet Contoller #2
Video Contoller Port Card
Ethernet Contoller #3
Voice Contoller Port Card
COMMON ATM SWITCH FABRIC
Transmit Channel #1
Transmit Channel #2
Transmit Channel #3
Transmit Channel #4
Receiver Channel #1
Receiver Channel #1
Downstream Channel 1
Downstream Channel 2
Downstream Channel 3
Downstream Channel 4
Upstream Channel 1
Upstream Channel 2
STU
VPI103
VPI103
305
310
311
311
311
2101
2103
309
309
309
309
2102
2104
307
313
306
308
301
303
304
3701
3702
106
103

Figure 37.

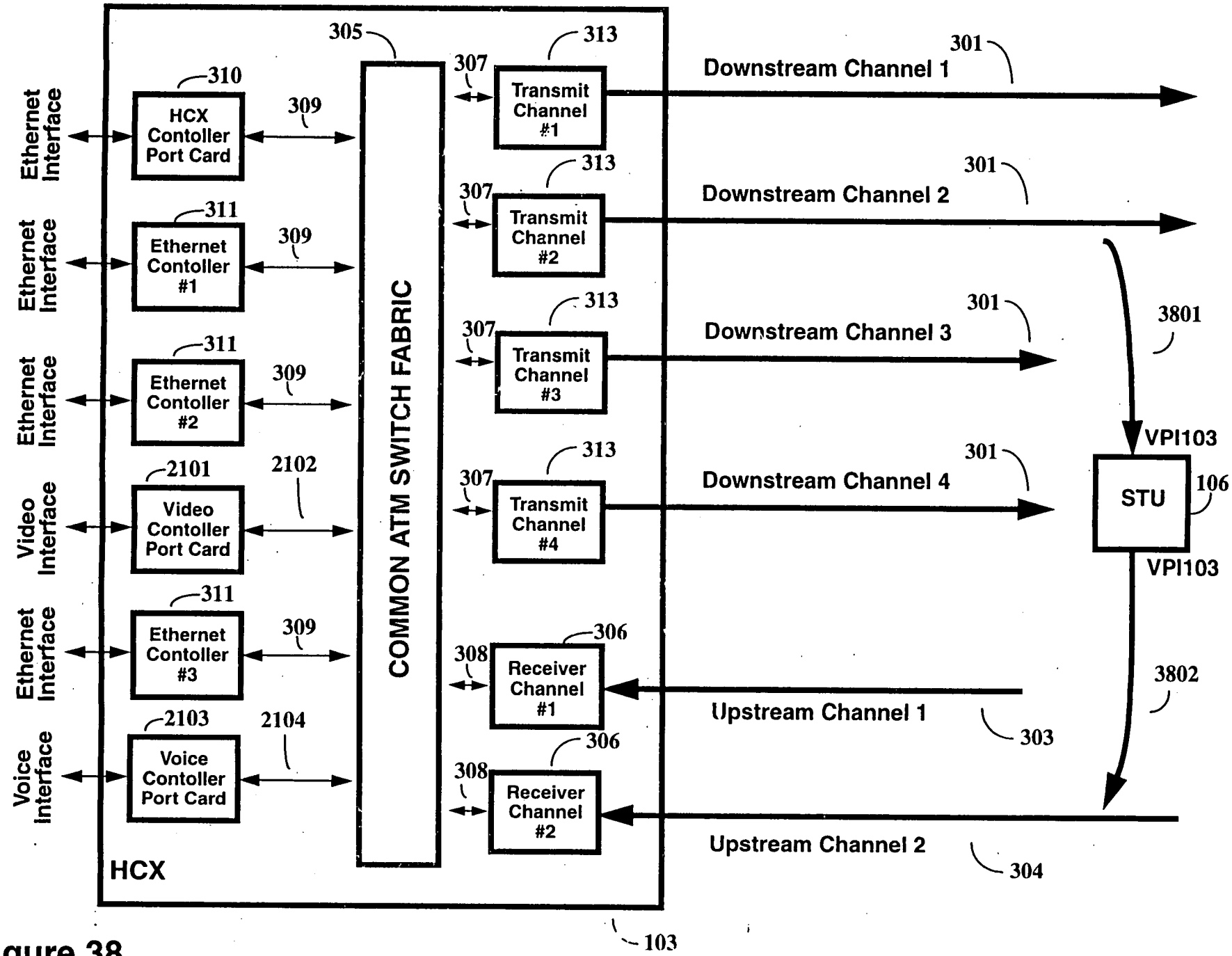
HCX
COMMON ATM SWITCH FABRIC
305
HCX Contoller Port Card
310
309
Ethernet Interface
Ethernet Contoller #1
311
Ethernet Contoller #2
Ethernet Contoller #3
Video Contoller Port Card
2101
2102
Voice Contoller Port Card
2103
2104
Video Interface
Voice Interface
Transmit Channel #1
Transmit Channel #2
Transmit Channel #3
Transmit Channel #4
307
313
Receiver Channel #1
Receiver Channel #2
306
308
Downstream Channel 1
Downstream Channel 2
Downstream Channel 3
Downstream Channel 4
301
Upstream Channel 1
Upstream Channel 2
303
304
3801
3802
VPI103
VPI103
STU
106
103

Figure 38.